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THE DETERMINANTS OF CHILDREN'S AND ADULTS' BEHAVIORAL PROCESSES IN HOME AND CENTER BASED CHILD CARE

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THE DETERMINANTS OF CHILDREN'S AND ADULTS' BEHAVIORAL PROCESSES IN HOME AND CENTER BASED CHILD CARE

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Dedication

To my children

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THE DETERMINANTS OF CHILDREN'S AND ADULTS' BEHAVIORAL PROCESSES IN HOME AND CENTER BASED CHILD CARE

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Previous research on the determinants of child care quality has led many to conclude that there is such substantial covariance between the quality of child care providers and the settings in which they work that the two are not meaningfully distinguishable. This study used data from the NICHD Study of Early Child Care (when participating children were 24-months-old), to examine the relations between various aspects of the caregiving environment, caregiver traits and children's and adults' behavioral processes and interactions in the child care setting. Hierarchical regressions were used to test a model proposing that caregiver traits (e.g. formal training, beliefs about childrearing, professionalism) and characteristics of the environment (e.g. child-adult ratio, scheduling, learning materials) contribute independently to the prediction of these behavioral processes.

Among child care center settings (N = 177) there was substantial support for the proposed model. The majority of behavioral processes in these settings (e.g. positive engagement between children and adults, children's prosocial behavior) were best predicted by the independence model. Among child care home settings (N = 184) there was support for both the covariance and independence models. Results suggest that the development and use of quality measures that disaggregate the contributions of individual caregivers and the environment from the behavioral processes in child care center settings would be useful for furthering research in this area and a more theoretically sound way to conceptualize the effects of child care on children's development.

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Introduction

Rationale.

Over the last 25 years, a significant amount of research has been conducted on the effects of non-maternal child care on children's socioemotional and cognitive development. Several large scale studies have been conducted to examine the availability of and variability in child care quality across different arrangements, including relative, non-relative, and center based child care (e.g., Cost Quality Outcomes Study Team, 1995; Kontos, Howes, Shinn, & Galinsky, 1995; NICHD Early Child Care Research Network, 1996). This line of research suggests that high quality child care comprises a safe and stimulating physical environment, warm and responsive caregivers, and developmentally appropriate curricula and activities (Kontos & Fiene, 1987) and that high quality care is more likely to support children's optimal development than care of average or poor quality (Vandell and Powers, 1983).

Although a clear connection has been made between the *global* quality of care and children's concurrent and later socioemotional and cognitive development, less is know about the *processes* by which child care quality exerts its influence. Research in this area has only recently begun to move beyond the correlational analyses that have led some to conclude, "that in child care, all good things go together" (Whitebook, Howes, & Philips, 1991). There seems to be little appreciation for the fact we have arrived at this assumption, in part, because of the way global quality measures are constructed. Occasional attempts to demonstrate that the subscales of global quality measures, such as the Early Childhood Environment Rating Scale- Revised (ECERS-R; Harms, Clifford &

Cryer, 1998) and the Assessment Profile for Day Care (Abbott-Shim & Sibley, 1992; see Scarr, Eisenberg, Deater-Deckard, 1994 for an example), are not meaningfully distinct have failed to make much of an impact. These measures are still in wide use despite the fact that they lack the refinement needed to further research in this area. The subscales (and sometimes individual items) on these measures notoriously confound the characteristics of caregivers and the caregiving environment with each other and the behavioral processes in the child care setting of quality making it impossible to determine the influence of the former on the later.

This is problematic because the grand theories of human development suggest that development is occurs as a result of children's *behavioral interactions* with adult caregivers and peers (Vygotsky, 1978) and their exploration of the physical environment (Piaget, 1952). This study has been designed to address some of the weaknesses of current approaches by carefully disaggregating two of the main components child care quality -- the characteristics of the caregivers and the caregiving environment -- in order to determine if they can be properly characterized as distinct or if their covariance ("all good things go together") is the best way to conceptualize their relation.

These disaggregagted sets of quality indicators will be used to predict the behavioral processes of 24-month-old children and their adult caregivers in two of the most commonly used forms non-parental care: child care centers and non-relative family child care homes. These analyses will be a first step toward deepening our understanding of the processes that mediate quality indicators and developmental outcomes for young children. These results of these analyses also will allow for the examination of the

predictive value of individual variables within the larger groups to determine if any are of particular importance in predicting the behavioral processes of toddler age children and their caregivers.

Current Method

Efforts to understand the components and predictors of high quality child care have often relied on the correlation of various *indicators* of quality (e.g., child-adult ratios, caregiver attitudes) with each other or directly with child outcomes (e.g., level of cognitive development) (for an example, see NICHD ECCRN, 2000a). These indicators vary from study to study, but a fairly consistent distinction is made between the structural and process aspects of care, and occasionally the regulatory influences on them (see Phillips, Howes & Whitebook, 1992, for an example). Structural indicators of quality are typically those that are easily quantified and regulated, for example: teacher education or training, group size, and adult-child ratios. Process indicators of quality are usually the more difficult to quantify and regulate, behavior-based variables, such as: teacher sensitivity and attentiveness, and the use of developmentally appropriate discipline techniques (Bordin, Machida, & Varnell, 2000; Phillips, Mekos, Scarr, McCartney, & Abbott-Shim, M, 2000).

The definition and operationalization of the predictors and indicators of child care quality in this way has been useful in identifying the facets of care that are associated with one another and with desirable child outcomes. Recent efforts have been made to expand the number of indicators by including such variables as teacher wages, and to estimate the relative contribution of different indicators to global quality (Phillips et al.,

2000). However, the usefulness of these correlational studies has reached an asymptote, and current methods are not particularly useful for advancing the research in this area. Each study inevitably comes to the same conclusion, "that in child care, all good things go together" (Whitebook et al., 1991).

The goal of this study is to examine the determinants of various behavioral processes and interactions among the participants of the NICHD Early Child Care Study at age 24 months, their peers and their adult caregivers. This research should make a unique contribution to the way in which the determinants of child care quality are conceptualized by developing support for an alternative to the correlational model. This new model differs from the one currently used in two ways. First, rather than distinguish between *structural* (regulable) and *process* (nonregulable) indicators of children's developmental progress, the proposed model makes a distinction between the characteristics of children's *caregivers* and the *caregiving environment*. This model allows for a distinction between the physical and organizational aspects of care and those characteristics that are more appropriately considered caregiver traits. Second, these two distinct contributors to child care quality will be used to predict the moment-to-moment behaviors of adults and children in the caregiving setting. This is an improvement over the way child care quality determinants and outcomes are operationalized, because it allows us to examine the intervening processes that promote development rather than confounding them with the predictors of these processes. A visual comparison of the two models is presented in Figure 1. The focus of this paper will be to examine the

usefulness the first part of this model; the theoretical affect of behavioral processes on children's development will be reviewed, but not empirically examined in this paper.

There are many ways in which the characteristics of caregivers and the caregiving environment could influence behavioral processes in the child care setting, including possible mediational, moderational and interactive effects. However this paper will focus on the most basic question proposed by this model: Is it possible that the characteristics of caregivers and the caregiving environment exert independent (and potentially additive) effects on behavioral processes or do they covary to the extent that their influence is indistinguishable (i.e., "all good things go together"). In the following section I begin to develop support for the proposed model, first by reviewing the professionally recommended practices for the care of toddler age children and the ways in which these processes are associated with the children's development, thus elucidating the link between behavioral processes and development. Next, I review the literature on the determinants of these processes in the context of the proposed model; that is, I examine the contributions of caregiving environments and caregivers separately.

The Developmental Importance of Behavioral Processes

Recommended caregiving practices. High quality child care is designed to meet the social, emotional, physical, and intellectual needs of children (Bredekamp & Copple, 1997). Currently recommended "high quality" practices, as outlined in Developmentally Appropriate Practice (DAP), and early education goals are based on theory and research in child development, but also the prevailing attitudes and beliefs among early childhood professionals (Bredekamp & Copple, 1997). For example, early childhood professionals

place more emphasis on free exploration of the environment than they did 30 years ago, when there was more of a focus on caregiver-directed socialization of young children.

Recommended practices emanate from the dominant developmental issues among children of different ages. The 24-month old children who are the focus of this study are expected to be concerned with issues surrounding their budding sense of independence and their continued desire to explore the environment (Bredekamp & Copple, 1997). Children of this age are increasingly willing to assert their autonomy and pursue their goals even when those objectives are in conflict with the desires of the caregiver or other children -- making individual and group management a unique challenge for caregivers. Toddler age children also demonstrate a new focus on personal regulation, including an increasing ability to regulate their bodies (e.g., toilet training) and their emotions (e.g., communicating their needs verbally rather than by crying). Children's receptive and expressive language abilities increase exponentially during the toddler period and their play is deepened through an increasing ability to use symbolic representations (Bredekamp & Copple, 1997).

Effective caregivers have a number of techniques at their disposal that make managing individuals and groups of toddlers less frustrating for themselves and development-enhancing for the children in their care. For example, capable caregivers can acknowledge and support children's sense of independence by offering children choices whenever possible (e.g., "Would you like the green cup or the blue one?") (Bredekamp & Copple, 1997). Caregivers can also help toddlers use their increasing verbal abilities to express their emotions when they are angry and frustrated, thereby

reducing the chances that toddlers will resort to aggression and temper tantrums (e.g., "Did it make you mad when she took your toy?").

There are also recommended practices regarding the caregiving environment, scheduling and routines. Developmentally Appropriate Practice advises that the caregiving setting be outfitted with durable and easy-to-clean materials, low sinks, and other accommodations that allow toddlers to freely choose and successfully accomplish their goals without undue interference and restriction from caregivers. Predictable schedules are recommended because they allow toddlers to form expectations and to develop a sense of security from the familiar routine. Young children's physical development is enhanced by opportunities for fine and gross motor activities both indoors and out (Bredekamp & Copple, 1997).

There is substantial evidence that the use of these (and many other) recommended practices is associated with children's optimal growth and development. The following section delineates some of the aspects of care that have been associated with positive child outcomes and helps to focus our attention on the characteristics of caregivers and caregiving environments that best support children's development. Some of the most important domains of development that have been associated with the global quality of care and caregiving processes among toddler age children are: physical health and safety, language and cognitive skills, and socioemotional development.

Physical health and safety. Across all 50 states, the features of the child care that are most likely to be regulated are those concerned with children's physical health and safety. These regulations are an essential foundation for all development-enhancing

programs because, without them, it is unlikely that children would be able to benefit from other facets of the programs. Regulations often center on the level of hygiene and sanitation (e.g., hand washing) required to minimize the transfer of communicable diseases, ensure food safety, avoid injuries, and ensure that staff members can knowledgably respond to emergencies (Fiene, 2002b). For example, in Texas, caregivers are required to update their Cardiopulmonary Resuscitation (CPR) training every two years (TDPRS, 2003).

Regulations regarding total enrollment and child-adult ratios are designed to avoid overcrowding and to ensure adequate supervision, usually according to the age or age mix of children in care. The physical health and safety of children that results from adherence to these regulations is studied much less frequently than other aspects of care. This is due, in part, to the fact that health and safety standards are often specifically outlined in state law, and monitoring mechanisms are in place to ensure compliance. As a result, there may be less variability than would be required to make meaningful distinctions across settings, at least among licensed child care centers and child care homes. Unfortunately, we know very little about the effect of unregulated care on children's health and safety.

Nevertheless, there is some work predicting children's health from various features of the caregiving environment. For example, the number of children in the setting (group size) is positively related to the number of upper respiratory infections children contract in child care homes and child care centers, particularly in the first two years of life (NICHD, 2001b). There are other aspects of the physical environment that are presumed

to affect children's health and safety; for example, in Texas, there are regulations that require outdoor equipment, furniture, and play materials be in good repair in order to minimize the chance of accidents (TDPRS, 2003).

Of course, not all features of care that are important to children's development are regulated. Developmentally appropriate play equipment that provides safe and interesting challenges promotes both small and large motor development (Weinstein, 1987) but there are often no regulations requiring the provision of particular types of outdoor equipment (TDPRS, 2003). The work of Elizabeth Prescott (1987) and colleagues suggests that indoor room arrangement can have an important influence on children's behavior. She recommends that caregiving environments avoid large, vacant spaces that might encourage wrestling and other rough play (and thus accidents). She also suggests that classroom arrangements provide meandering walkways, rather than long straight paths, which encourage children to run indoors. Separate activity areas or "centers" are presumed to encourage concentrated play (Bredekamp & Copple, 1997), thus minimizing the amount of time children spend watching others or otherwise unoccupied.

Language and cognitive skills. Caregiving processes, particularly the quality of language stimulation provided by caregivers, close student-teacher relationships, a non-authoritarian teaching style, and child-centered classrooms predict higher scores on cognitive and language measures among toddler age children in both centers and child care homes (Clarke-Stewart, Gruber, & Fitzgerald, 1994; NICHD ECCRN, 2000b; Peisner-Feinberg & Burchinal, 1997). Children with caregivers who are more

responsive, more sensitive, and less detached score higher on tests of language development (Whitebook, Howes, & Phillips, 1991). There appears to be a lasting effect of early language stimulation in the caregiving environment, particularly if it is received in the first two years of life (NICHD, 2000b). Higher rates of adult-child verbal interactions predict better scores on language inventories, whereas more frequent verbal interactions with peers predict lower scores on these measures (McCartney, 1984).

Children's cognitive development is also related to the structure of and activities found in the child care setting (Moore, 1987). In child care centers, the amount of time that adult caregivers spend reading to children and leading group lessons is associated with children's cognitive development, especially as children approach kindergarten age. In child care homes, higher levels of reading, caregiver attention, and structured activities, and lower levels of television viewing are associated with children's cognitive development (Clarke-Stewart, et al., 1994; Goelman & Pence, 1987). However, the relationship between the amount of structured activity and cognitive development is *curvilinear*, in that it is development-enhancing only up to a certain point (Clarke-Stewart et al., 1994). A balance between structured, adult-led activity and child-directed, unstructured activity is most likely to promote the intellectual development of young children.

The physical arrangement of the classroom is associated with children's self-initiated, exploratory behavior and sustained interaction with persons, objects and educational materials in the caregiving setting, all of which are hypothesized to promote cognitive development (Moore, 1987). A "modified open-plan" room arrangement is

most likely to be associated with these development-enhancing behaviors. This room arrangement uses windows, archways, and openings without doors to connect various parts of the facility (Moore, 1987). This arrangement is in contrast to an "open plan" with few or no partitions to organize areas of the classroom. Open arrangements are associated with more random (unfocused) child behaviors and greater attempts at teacher control. Teachers may need to exert greater control due to the large open areas described by Prescott (1987) that encourage running and wrestling. A "closed plan," facility with self-contained classrooms, is associated with higher levels of children's transitional and withdrawn behaviors (Moore, 1987). Clearly, children respond to the physical layout and arrangement of the child care setting and when they are in classrooms with a less than optimal arrangement, they have more difficultly becoming and staying engaged in learning activities, which could interfere with their ultimate cognitive attainment.

Socioemotional outcomes. Variations in the quality of caregiving are also associated with children's concurrent and later interpersonal behavior with adults and peers, social skills, and mother-child relationship quality even after controlling for family selection factors including income-to-needs ratio and maternal education (NICHD ECCRN, 1998; 1999a; 1999b). Higher quality caregiving in family child care homes and centers predicts sophistication of children's play with objects, with other children in the caregiving setting, and even their adult caregivers (Howes & Stewart, 1987; NICHD, ECCRN, 2001a).

Children who receive high quality care as infants exhibit fewer problem behaviors as toddlers and receive higher reports of social competence than would be expected on

the basis of their family characteristics. High quality caregiving processes in toddlerhood also predict fewer concurrent behavior problems, more self-control, more cooperative behavior at age 3, and later social competence at age 4 (NICHD ECCRN, 1998; 2002b). Children who have close teacher-child relationships report more positive feelings about their own competence, about their teacher, and about child care even after controlling for maternal education, gender, and ethnicity (Peisner-Feinberg & Burchinal, 1997).

Children who have highly involved caregivers exhibit more behaviors suggesting secure attachment (e.g., they explore unfamiliar surroundings more, have more contact with their caregivers, and orient more to their caregivers than to strangers) than children with less involved caregivers (Anderson, Nagle, Roberts, & Smith, 1981). Toddler children in classrooms that are rated as "good" or "very good" in terms of the caregiver interactions and the availability of developmentally appropriate activities, and who are securely attached to their teachers, exhibit more competent behavior with their peers. The relationship between the quality of care and social competence appears to be mediated, in part, by attachment security with the caregiver, which results in a social orientation toward peers and adults (Howes, Phillips & Whitebook, 1992).

High quality child care also is associated with children's self-esteem. One of the main components of self-esteem is a feeling of competence in the physical world (Briggs, 1975). The physical arrangement of the child care setting can promote a sense of competence by minimizing the difference between what children want to do, and what they are able to do (Weinstein, 1987). Caregiving environments with child-sized furniture, and low, clearly marked shelves, (among other furnishings) allow children to

choose their own activities and return the materials to the proper place when they are finished. This ease of navigation in the physical environment surely contributes to children's feelings of efficacy, thereby enhancing their self-esteem.

In child care centers, the arrangement of the classroom and the curriculum also affect the quality of children's peer relationships. Programs with clearly defined activity centers, higher levels of structure, more adult-led lessons, and developmentally appropriate activities are associated with greater social competence with peers (Howes et al., 1992; Weinstein, 1987). In child care homes, a more structured day, more toys and fewer household hazards are associated with more social competence with peers. More time spent watching television or alone and the lack of other children (particularly older children) in the family child care setting is associated with lower levels of peer competence. Of course, just as was the case with cognitive development, a school-like, structured environment is probably valuable up to a certain point. Ample opportunity for unstructured interactions with other children is also valuable in promoting socioemotional development (Rosen, 1974).

Interestingly, child-caregiver attachment appears to have lasting effects on children's perceptions of teachers well into middle childhood, which could affect children's long term attitudes about formal education. Children's perceptions of their elementary school teachers as supportive, indifferent, or hostile are predicted by their earlier (toddler age) attachment security to their child care providers (Howes, Hamilton, & Philipsen, 1998). This suggests the importance of laying a foundation for positive school age teacher-child relationships in infancy and toddlerhood. Children who have

warm and responsive caregivers during the preschool years may be predisposed to like and trust their teachers in elementary school, which may be an important prerequisite to school success.

Clearly, the global quality of care and specific setting processes are can positively or negatively affect many critical aspects of children's development, often in ways we would not surmise. For example, sensitive and responsive caregiver behavior predicts children's language and cognitive development, and classroom arrangement and engaging materials are associated with competent peer relationships. In the next section, we will consider some of the determinants of these important processes. Throughout the discussion I will discuss these determinants in the context of the model described in Figure 1. I will begin with an examination of the characteristics of the caregiving environment, that is, aspects of care that would be expected to remain approximately the same if one child care provider were to leave and another take her place.

Characteristics of the Caregiving Environment

Child-adult ratios. One of the most extensively examined aspects of the caregiving environment is the ratio of adults to children in the classroom or family child care home. Child-adult ratios are *strongly* related to the quality of care children receive independent of other aspects of the caregiving environment (Phillipsen, Burchinal, Howes & Cryer, 1997; for an exception see Howes, 1997). Child-adult ratios also are one of the most commonly regulated aspects of care, and maintaining recommended ratios is an important criterion for accreditation with the National Association for the

Education of Young Children (NAEYC) and the National Association of Family Child Care (NAFCC).

Teachers in classrooms that are in compliance with professional recommendations for ratio are more sensitive, less harsh, less detached and more responsive than those in classrooms that are not in compliance (Cost Quality and Outcomes Study, 1995). In center- and home-based settings, fewer children per adult are associated with both a higher quality and frequency of caregiving for infants and toddlers. In fact, young children in child care centers that had low child-adult ratios (e.g., 3:1 at 15 months; 7:1 at 24 months) receive the same quality and frequency of care as children who are cared for by grandparents and fathers (NICHD ECCRN, 1996, 2000a).

Low child-adult ratios are associated with the provision of a more cognitively stimulating environment. Adults and children talk to one another more when ratios are low, and caregivers engage in more dialogues (i.e., verbal communications between a caregiver and child that involve an exchange of at least three turns) and fewer monologues (i.e., verbal communications that contain only one or two sentences and only one or two turns; Palmerus, 1995). Lower ratios also allow caregivers to engage in more activities that are educational (e.g., teaching, promoting problem-solving) and developmentally appropriate for the children in their care (Dunn, 1993; Palmerus, 1991)

When child-adult ratios are low, children are more likely to receive individualized attention, have positive interactions with caregivers, and to be properly supervised (Dunn, 1993; NICHD ECCRN, 1996; Whitebook, Howes, & Phillips, 1991). In classrooms with high numbers of adults relative to children, there is more caregiver interaction with

children (e.g., talking, playing, touching, and laughing), more responsive and stimulating behavior, and more caregiver responsiveness to children's social bids and requests (Howes, 1983; NICHD ECCRN, 1996; Smith & Connolly, 1981). Low ratios also are associated with higher rates of secure attachments between toddlers and their caregivers (Howes, Rodning, Galluzzo, & Myers, 1988).

Appropriate ratios also allow caregivers to provide a safer caregiving environment, presumably through better monitoring and supervision. For example, in environments with low child-adult ratios there are fewer situations involving potential danger, such as children climbing on furniture (Hayes, Palmer & Zaslow, 1990). When there are too many children in the setting, it may be difficult to properly supervise and control children while simultaneously encouraging a high level of children's activity and exploration, particularly for less skilled caregivers. In fact, high ratios are associated with higher rates of caregivers expressing irritability to children, as well as higher levels of restricting children's behavior (e.g., more commanding and correcting; Smith & Connolly, 1981).

Group size. Although Clarke-Stewart et al., (1994) suggest that caregivers provide less attention, affection, responsiveness, and stimulation each time a single child is added to a group, there is mixed support for the idea that the number of children in a child care setting is inversely related to the quality of care, particularly when the child-adult ratio (Phillipsen, et al., 1997) or type of care (Clarke-Stewart et al, 1994; Fosberg, 1981) is taken into account. There is evidence that the number of children in a group is inversely related to the frequency and warmth of care in centers (NICHD, 1996; NICHD,

2000b); and that caregivers with small groups spend substantially more time interacting (praising, responding, comforting, questioning, and instructing) with the children in their care than do those with larger groups (Ruopp, Travers, Glantz, & Coelen, 1979), but the influence of group size sometimes becomes nonsignificant after accounting for child-adult ratio (Phillipsen, et al. 1997)

There is little evidence for an inverse, linear relationship between the quality of caregiving and group size in family child care homes. The Study of Family and Relative Care (Kontos et al., 1995) demonstrated that larger group size in home-based child care is often associated with *higher* quality care than smaller group size. In this study, home-based providers who cared for 3-5 children provided higher quality care than those who cared for only 1-2 (Galinsky, Howes, Kontos, & Shinn, 1994). This positive association between group size and quality can be explained, in part, by the fact the caregivers with larger groups had higher levels of training and more professional commitment to providing care.

In other studies, group size was unrelated to global family child care quality, possibly because of a curvilinear relationship between group size and quality in these settings. For example, compliance to the National Association of Family Child Care (NAFCC) recommended groups size "points" failed to predict global quality, but was negatively associated with the frequency of caregiving behaviors (Burchinal, Howes, & Kontos, 2002; Clarke-Stewart, Vandell, Burchinal, O'Brian & McCartney, 2002). It seems that larger group size is associated with higher quality *up to a certain point*, after

which the group becomes too large for a home based caregiver to attend to the children in her care effectively.

Materials, physical space, and scheduling. There has been little focus on the types of materials available to children and the organizational aspects of the caregiving setting in recent years, so research in this area has progressed little since the late 1980's. However, the research that has been done suggests that the developmental appropriateness of materials, physical space, and the scheduling of activities for young children has an important influence on both adult and child behavior in centers and child care homes.

One aspect of the physical environment that has been investigated is the availability of "child-designed space" (i.e., a space that had no breakable or unsafe adult items). Not surprisingly, child care centers are more likely to have child-designed space than are child care homes; however, in both settings, less child-designed space predicts higher levels of caregiver restrictiveness (Howes, 1983). Caregiving settings that are "neat, orderly, and organized around children," that have fewer adult oriented and dangerous items, and that have a structured schedule are associated with children's positive cognitive and social development (Clarke-Stewart & Gruber, 1984).

A commodious, safe, and child-oriented environment can be one of the most expensive aspects of the caregiving setting to provide compared to the cost of toys, art materials and the like. Many caregiving settings are spaces that have been transformed from other purposes (e.g., office spaces, church basements, family living rooms) and vary widely in their appropriateness as caregiving settings (Weinstein, 1987). More research

on the effects of the classroom environment on caregiving quality and adult and child behavior is sorely needed, and the wide variety of spaces used for caregiving makes it ripe for exploration.

Characteristics of the Caregiver

The quality and competence of teaching staff are among the most important determinants of child care quality and the development of the children their care (Bredekamp & Copple, 1997). There are highly variable efforts across the state and local communities to regulate relevant caregiver characteristics in an effort to ensure that children receive the high quality care they require. These regulations usually come in the form of requirements for a minimum level of general education or specialized training in child development dependent upon the individuals' role in the caregiving setting (e.g. assistant vs. lead teacher). There are many other caregiver characteristics that are not regulated, but are nonetheless important predictors of the quality of care children receive. In addition to education and training we will examine the effects of some non-regulable features of the caregivers including: psychological well-being and beliefs about child rearing.

Education and training are among the most powerful predictors of quality caregiving, but it can be difficult to draw conclusions about the way they affect caregiving setting processes because the two are often highly correlated with one another. It is also difficult to determine the effects of training and education when there has been no consistency across studies in the way training has been operationalized and little attempt to control for when and how much training was received. In the next subsection,

the influence of general education, specialized training, and workshop participation will be discussed as "preexisting" caregiver traits without regard to how long ago the training or education occurred.

General education and specialized training. There is substantial evidence that both general education and specialized training in child development (CD) or early care and education (ECE) are strongly related to high quality caregiving among home based and center based child care providers (Burchinal et al., 2002; Clarke-Stewart et al., 2002; Howes, 1997a; Kontos et al., 1995; NICHD ECCRN, 1996; 2000a). Caregiver level of general education is positively correlated with the frequency and sensitivity of caregiving of infants and toddlers.

Among home based providers, those with a high school diploma score better on behavioral and global measures of child care quality than do those without one, and those with at least some college score better than those whose formal education ended at high school (Clarke-Stewart et al, 2002). Home-based child care providers with only a high school education are more likely to be classified as providing "custodial" care rather than "good" care on the Family Day Care Rating Scale (Harms & Clifford, 1980; Weaver, 2002).

Similarly, compared to those with less education, home- and center-based caregivers with at least two years of college are more responsive and encouraging toward children, are more sensitive and less harsh, are more likely to make relevant suggestions and to use indirect guidance, are less restrictive, and are more likely to encourage the development of children's verbal skills (Berk, 1985; Howes, 1997a; Howes 1997b).

Caregivers with specialized training in CD or ECE also provide higher quality caregiving and score higher on measures of developmentally appropriate practice than those with out it (Snider and Fu, 1990). Family child care providers with more specialized training in child development score higher on global and behavioral measures of quality even after accounting for their level of general education and family characteristics of the child in care (Clarke-Stewart, et al., 2002). Toddler caregivers in centers and family child care homes with higher levels of specialized training are more likely to play with children and respond positively to children's social bids (Howes, 1983).

Center-based toddler caregivers with higher levels of specialized training are less likely to make negative responses to social bids, more likely to express more positive affect, and to be less restrictive of children's activity (Howes, 1993). After pooling data from two large-scale studies, Howes (1997a) found a strong relationship between the level of ECE training (range: high school diploma plus ECE courses, to a BA in ECE) and the level of sensitive caregiving. Those with a BA in ECE were the most responsive caregivers, providers with Child Development Associate degree (CDA) had the highest level of positive interactions with children, and those with a BA or CDA scored equally well on the amount of language play and positive behavior management.

Workshop participation is a common type of training in the U.S., and for many child care providers, it is their only required training. Childcare providers who are "continuous" and "intermittent" workshop participants provide higher quality care than those who "never" attend workshops, even when controlling for caregiver general

education and the total number of workshops attended (Norris, 2001). However, workshop participation alone may not be able to provide caregivers all of the tools they need to provide high quality care. As we will see, the research suggests that workshops are best used to teach discrete topics that can meaningfully be addressed over a brief period of time (Gowen, 1987).

Although it is difficult to distinguish between the value of general education, specialized training, and workshop participation, there are some important underlying trends. Increments of post high school education are associated with a nearly linear increase in the quality of care children receive. Caregiver general education may be especially important as children approach the preschool years. For example, among family based caregivers, general education is more strongly related to global child care quality when children are 36 months old than at earlier ages (Clarke-Stewart et al., 2002). It is possible that higher levels of general education give caregivers the resources to provide a responsive and stimulating environment for older preschoolers. The results from the National Day Care Staffing Study support this possibility (Howes, et al.1992; Whitebook, Howes & Phillips, 1991). These data suggest that general education, rather than specialized training, is the best of predictor of caregiver-child interactions.

Psychological well-being. Psychological well-being may make a unique contribution to child care quality, but current research results are somewhat mixed. Caregivers with higher levels of depressive symptoms are more likely to report that the toddler and preschool age children in their care have behavior problems and that these children are less cooperative, but depressive symptoms do not predict necessarily the

overall quality of caregiving (NICHD, 1999b). The behavior of clinically depressed caregivers may undermine children's social and intellectual development the way that depressed mothers do, through insensitive and non-responsive child-caregiver interactions (Clarke-Stewart et al. 2002; NICHD ECCRN, 1999a).

Caregiver attitudes and beliefs: Developmentally appropriate beliefs about children, less traditional child rearing beliefs, and community-oriented motivations for providing care are associated with the frequency and quality of caregiving, responsive involvement of caregivers and higher levels of sensitivity among family and center based caregivers of infants, toddlers and preschoolers (Abbott-Shim, Lambert & McCarty, 2000; Clarke-Stewart, et al., 2002; Howes, James & Richie, 2003; Kontos et al., 1995; NICHD ECCRN, 1996, 2000a). These beliefs may exert their influence in a number of ways, including their mediation by various aspects of the caregiving environment. For example, caregivers who score higher on measures of developmentally appropriate beliefs are more likely to provide a developmentally appropriate classroom (Maxwell, McWilliam, Hemmeter, Ault, & Shuster, 2001).

Developmentally appropriate beliefs may also help explain the relationship between training, education, and various measures of child care quality. Abbott-Shim et al. (2000) used structural equation models to investigate the relationship between caregiver education scores on the Teacher Beliefs Scale, instructional activities and overall classroom quality. With teacher beliefs included in the model, the relationship between education and instructional activities was reduced to nonsignificance. Clarke-

Stewart et al. (2002) also were able to show that modern child rearing beliefs mediated the relationship between caregiver behaviors and global child care quality.

Caregiver experience and age. Research rarely shows a positive, linear relationship between the caregiving quality and caregivers' years of experience (see NICHD, 1996 for an exception). In fact, it is more often the case that there is no relationship (Clarke-Stewart et al., 2002; NICHD, 2000a; Travers et al., 1980) or that the relationship is curvilinear in which caregivers with a moderate amount of experience provide the highest quality care (Philipsen et al., 1997). This idea is supported by studies showing that caregivers with a modest amount of experience as a home-based provider have higher global quality scores and more workshop participation than those with few or many years of experience (Norris, 2001), while more years of experience are associated with more detached and harsh adult-child interactions (Galinsky, et al. 1994), and lower global ratings of quality (Burchinal, et al., 2002). It is not yet clear why this might be the case, but across studies, younger caregivers seem to have more interest in receiving training (Kontos, Howes & Galinsky, 1996) and older caregivers are least likely to believe they need training (Collier Rusby, 2002).

Of course, what appears to be an age or experience effect could be a cohort effect, because caregivers from earlier generations may have less modern childrearing beliefs, which, in turn, affect their behavior in the caregiving setting. Interestingly, caregivers with a moderate amount of experience are often the most highly trained, professionalized caregivers. It may be the case that after a few years these moderately experienced young caregivers may become directors or may leave the field to pursue other better paying

professional opportunities. Once these more professionalized caregivers leave the setting, their positions might then be filled by younger, less experienced caregivers while those with many years of experience but less motivation and ambition remain. These staffing dynamics offer a plausible explanation for the curvilinear association between caregiver age and quality of care.

Although experience and age appear to influence caregiving quality, these relations are often reduced to nonsignificance when included in a model with other nonregulable features of care, like child-centered beliefs (Clarke-Stewart et al., 2002). Because the relations between age or experience and quality are easily reduced to nonsignificance, it seems unlikely that there is an independent effect on caregiving processes. Nonetheless, because age and experience could be systematically associated with these stronger predictors (e.g., specialized training, workshop participation) they should be included in analyses as statistical controls.

Caregiver training. This type of professional development, whether required by state regulation or designed as a community-based intervention, is distinct from formal training in that is undertaken by women who are already employed as caregivers. This type of training can take many forms, from brief seminars and workshops to degree programs at community colleges. In spite of the fact that there is almost no consistency in the curricula across training programs, it is possible to draw some conclusions about the importance of particular topics and the amount of time that should be invested to produce significant changes in caregiver behavior.

Workshop training can be as brief as a lunch hour staff development meeting or as long as a 3-day seminar, but they always require much less time, energy, and expense than college level courses. They also are less likely to conflict with work and school schedules, which may be why workshops are the most common type of training child care providers receive. Workshops appear to be most effective at teaching a small amount of very specific information. For example, Gowen (1987) developed a 3-day workshop designed to increase caregivers' verbal involvement during children's play. Post training, 100% of participants had increased their level of verbal involvement with the children in their care. Another half-day workshop was designed to improve caregivers' communication skills by reducing their use of directive language and, at post-test, 50% of the caregivers had made a significant improvement in this area.

The workshop format is less effective at improving global quality of care and adult-child interaction in centers and family child care homes. The multi-site, Family-to-Family training program (Kontos, et al., 1996) was designed to be more rigorous than typical community based family child care training. Locally administered training workshops were required to address particular topics including: health and safety, learning activities, nutrition, child guidance, and business practices; but there were no centrally produced teaching materials, so participants in different locations had different learning experiences. Participants also spent varying amounts of time in their workshops-- anywhere between 15 and 25 hours of formal instruction.

Participants were pre- and post-tested with a global measure of child care quality and a measure of sensitive adult-child interactions, but the only significant improvement

at post-test was in business practices. There are several reasons why this might have been the case. It is possible that the workshops covered a broad amount of material, but in a rather shallow manner. There also may not have been enough consistency from program to program to measure significant improvement in most topic areas, or the length of the program may have been too short. Short-term interventions like this have occasionally been successful. Caruso, Horm-Wingerd, & Golas, (1998) found that a 3-5 day in-service training program improved participants' knowledge, skills and expertise, and that the improvement was detectable 6 months later. It may be possible that workshops that are well designed, consistently administered, and narrowly focused may be able to make a lasting improvement in caregiver knowledge and behavior.

Training also can take the form of college coursework, which is certainly more rigorous and demands more commitment of time and effort from participants than workshops. Cassidy, Buell, & Pugh-Hoese (1995) evaluated the impact of the first year of an Associate of Arts (AA) program, which was supported by the Teacher Education and Compensation Helps (T.E.A.C.H.) scholarship program, in which participating caregivers took between 12-20 hours of community college credit (182-320 classroom hours). Post-training scores showed caregivers had significant increases in the global quality of their infant, toddler, and preschool classrooms, offered more developmentally appropriate activities, and had more developmentally appropriate beliefs than a comparison group of untrained providers.

Ongoing training can have positive influences even on those with extensive (5+) years of classroom experience. Kaplan & Conn (1984) conducted a pre- and post-test

training evaluation of a 20-hour course. After training, these experienced teachers showed improvements in their caregiving quality as well as improved physical condition of the room and available materials. Rhodes & Hennessy, (2001) evaluated the effectiveness of a 120-hour professional course offered to professional caregivers who had an average of 6 years of experience. The curriculum included training on the developmental needs of children, the importance of play, curriculum development, and encouraging parental involvement.

After training, caregivers were significantly less detached from their students than a closely matched comparison group. In addition, the children in their care showed significantly more sophisticated play with peers and classroom materials than children whose teachers had not taken the course. These improvements in adult and child interactions are a strong indicator that caregiver behaviors are malleable even among experienced caregivers.

Research Questions and Analysis Plan

Given the preceding review of the literature, there seems to be a sufficient basis for examining the possibility of the independent contribution of the characteristics of the caregiver and the environment on behavioral processes of adults and children in the caregiving setting. This model deviates somewhat from the way child care variables are often conceptualized, in which the *structural* and *process* aspects of care are used to predict global child care quality or developmental outcomes for children (see top half of Figure 1). In comparison, proposed the model has two distinct advantages. First, it emphasizes the contribution of the caregiver, whose influence is diluted in analyses that

separate qualities of particular individuals (e.g. level of education would be considered *structural*; and level of sensitivity which is considered *process*) all of which would be lost if a particular caregiver were to leave the setting and another take her place.

Second, the dependent variables in this model are adults' and children's behaviors in the caregiving setting rather than global measures of quality or indictors of children's development. Global quality measures make it very difficult to determine which aspects of care lead to optimal development for children because they confound widely divergent aspects of care (e.g., the quality of peer relationships, the arrangement of classrooms, nutritional value of snacks; Harms et al., ECERS-R, 1989). In addition, the *a priori* subscales from these global quality measures rarely have predictive value (Phillips et al., 2000). Developmental theory suggests that the children's daily interactions with their caregivers, their peers, and the materials in the caregiving environment are the mechanisms by which development occurs. In the proposed model (bottom half of Figure 1), these behaviors are mediating variables that we would expect to be associated with later cognitive and socioemotional growth.

Given the current problems associated with the operationalization of the contributions of the caregiver and the caregiving environment and the theoretical importance of behavioral processes, I propose the following three research questions:

Question 1. Do the characteristics of the caregiver and the caregiving environment influence child and adult behavioral processes independently?

Although many of the extant measures from the NICHD Early Child Care Study can easily be distinguished as characteristics of the caregiver (e.g., depression, formal

training), several of the environment measures are distilled from the global quality measures used in the study (e.g. Assessment Profile). This is accomplished through exploratory factor analysis and the careful examination of individual items that comprise these factors. Global quality measures are used to create distinct indicators of available materials, the safety and health of the setting, and the structure of the daily schedule. These analyses use an existing measure of child-adult ratio.

Question 2. Do the relations of the caregiver and the environmental predictors to processes in the setting operate similarly across center- and home-based caregiving settings?

Each set of regression analyses are run separately for home and centers. It is reasonable to assume that the pattern of relations may be different across these types of settings. In child care centers, many aspects of care are not directly under caregiver control. Decisions about child-adult ratio, scheduling and the availability of materials are more likely to be made by directors and other administrators, while health and safety practices are often regulated by the state. In general, many aspects of care would be expected to stay the same if one caregiver were to leave and another to take her place. In contrast, in home-based settings, the number of children in care, the availability of materials and daily routines are much more likely to be under the direct control of the caregiver and the possibility of the covariance between caregiver traits and environmental features is higher.

Question 3. Within the environmental and caregiver sets of predictors and across type of care, are any discrete variables particularly important?

The characteristics of the environment and caregiver will be entered as blocks of predictors, but each variable will have a unique regression coefficient and significance test associated with it. This approach offers an opportunity to examine the possibility that particular individual variables are important predictors of behavioral processes even in the presence of other, often highly correlated, measures. If there are certain variables that consistently predict behavioral outcomes in the full model and/or across type of care, their value may provide a basis for further research.

Method

The NICHD Study of Early Child Care is distinguished by its breadth and detail of design. Its unique features include (a) 10 sites located across major regions of the country in urban, suburban and rural areas, representing different populations and widely varying state child care regulations; (b) inclusion of ethnic-minority, single-parent, and low-education families at every site; (c) children followed from birth through a wide range of child care experiences rather than being recruited after child care arrangements were already made; (d) extensive direct observation of all types of child care arrangements, and; (e) and the use of multiple quality-of-care indices including: caregiver and focal children's behavior in the caregiving setting, observed global quality of the care setting, and extensive descriptive information about the caregivers and administrative staff (in centers). Participating children were observed in their primary child care arrangement at 6, 15, 24, 36, and 54 months of age. The present study focuses on the data collected at the 24-month visit.

Participants

Families were recruited during the first 11 months of 1991 through hospital visits to women (N = 8986) giving birth during selected 24-hour intervals at 10 sites (Charlottesville, VA; Irvine, CA; Lawrence, KS; Little Rock, AR; Madison, WI; Morganton, NC; Philadelphia, PA; Pittsburgh, PA; Seattle, WA; and Wellesley, MA). Approximately 60% of the families met the eligibility requirements (mother healthy, over 18, and conversant in English; baby not a multiple birth, not released for adoption, and not hospitalized for more than 10 days; family living within 1 hour of the research site

and neighborhood was safe enough for home visitors) and agreed to consider participating in the study. A random sample of these families was selected and 45% participated in the 1-month home visit. A total of 1,364 families with healthy newborns were enrolled in the study, with approximately equal numbers of families at each site.

At the 24-month assessment point, 1239 families were still enrolled in the study. Children enrolled in any type of child care for at least 10 hours per week were observed in their primary non-maternal arrangement in addition to home and laboratory observations. Trained observers conducted during two half-day visits scheduled within 2-week intervals. At each visit, observers completed two 44-minute cycles of the Observational Record of the Caregiving Environment (ORCE; detailed in the next section), which was developed specifically for this study. In addition to observer ratings, extensive interview and questionnaire data were collected from caregivers and center directors. A modified version of the caregiver interview that was utilized in the National Child Care Staffing Study (Whitebook, Howes, & Phillips, 1990) was administered to home and center based caregivers. The interview is designed to obtain information about each caregiver's background (education, training, and experience), details about their care of the target child, wages and working conditions, reasons for providing child care, and future plans.

There were significant differences in the likelihood of being observed in child care depending on various family and child care factors. In particular, children in the unobserved group had significantly lower income-to-needs, lower average maternal education, and were more likely to be from study sites located in the southern U.S. At

24-months, the unobserved group also had significantly more starts of child care over the first 2 years of life, were more likely to be in family child care homes or with grandparents or fathers than in centers or nanny care. The present analyses include only those children who were observed in care: 177 in center-based arrangements (78% of those primarily in this type of care), 184 in non-relative home-based care (71% of those primarily in this type of care).

Child Care Measures

Type of care. During the 23-month phone interview, mothers reported the types of child care arrangements they used regularly (up to 3). Contact information was obtained for the child care setting in which the child spent the most time each week, so that an observation visit could be scheduled. If the child spent equal time in two settings, the more formal of the two was regarded as the primary setting. Primary arrangements included: the child's mother (28% of the total sample at 24 months), the child's father or mother's partner (12.2%), a grandparent in the child's home or another's home (8.8%), another relative in the child's home or another's home (4%), in-home, non-relative care (7.2%), in non-relative family based child care (20.9%) and center based care (18.2%). The analyses will be limited to the later two groups because they are arguably the most formal, most likely to be provided by trained caregivers, and are most likely to be subject to state and local regulation, all of which are relevant to the proposed analyses.

There are few demographic differences between the families that used the two types of child care arrangements that are the focus of this paper (centers and non-relative family child care; Appendix A). A slightly higher percentage of children in center care

are non-white compared to those in family child care, but children are in care approximately the same number of hours per week across arrangement type. The children's mothers have the same median hourly wage, but the mothers of children enrolled in centers earn slightly more each year and have a slightly higher average income-to-needs ratio. The weekly amount paid for care is slightly higher in center-based settings. Overall, there is little evidence to suggest that there are any systematic differences between the mothers and children who use each of these two child care arrangements. It is important to note that not all of these center and non-relative home-based arrangements were observed. As mentioned earlier, 177 (78%) of those in centers and 184 (71%) of those in non-relative home-based care were observed in their child care setting.

Caregiving environment.

Group size. This measure of group size is the average of the interviewer observed group size on each of the two observation visit days. This measure is used instead of the caregiver reported group size because daily variations in group size is expected to influence adult's and children's behavior in the setting. Average group size across the center-based settings is 10.49 children (*SD* = 4.73). In home-based settings, the average group size is 4.38 children (*SD* = 2.17).

Child-adult ratio. As above, the average of the observer-recorded ratio of adults and children present across the two observation visits is used instead of the caregiver-reported ratio. Daily variations in child-adult ratio are expected to influence children's and adults' behavior in the caregiving setting. The mean child-adult ratio in center-based

settings is 5.42 children per adult (*SD* = 1.92). In home-based settings, the ratio is 3.48 children per adult (*SD* = 1.73).

Assessment Profile for Early-Childhood Programs. The Profile (Abbott-Shim & Sibley, 1992) is an observational measure intended to provide a comprehensive assessment of center quality. At the 24-month visit, observers completed 5 of the 6 subscales on the toddler version of this measure: Safety and Health (7 items; α = .52), Learning Environment (11 items; α = .55), Individualizing (18 items; α = .86), Scheduling (10 items; α = .85), and Curriculum (16 items; α = .82) (excluding Interacting). Two additional dimensions of quality, not originally included in the Profile were added. These additional items assessed the Physical Environment (3 items; α = .31; (adapted from Wachs, 1986) and Adults Needs (7 items; α = .60; a subscale from Harms & Clifford, 1980). The total scale score can range from 0-72 (72 items; α = .92). Three methods of data collection are used to complete the Profile: observation, review of documentation, and discussions with directors or caregivers. Each subscale contains a series of specific items that are coded dichotomously as present (yes) or not present (no).

Assessment Profile for Family Day Care. The Assessment Profile for Family Day Care (Abbott-Shim & Sibley, 1992) is the counterpart of the center Profile, adapted to suit the circumstances of home based care. It is also organized around a number of dimensions of care: Safety and Health (27 items; α = .73), Learning Environment (6 items; α = .58), Individualizing (5 items; α = .51), Scheduling (3 items; α = .36), and Curriculum (13 items; α = .80) (note: there are a different number of items and subscales from the center version of this measure). Each dimension contains a series of specific

items that are coded dichotomously as present (yes) or not present (no). The total score could range from 0 to 48 (48 items; α = .85). Three methods of data collection are used: observation, review of documentation, and discussion with the caregivers. Certain items were dropped from the Health and Safety Subscale when the target child was the only child present.

Home Observation for Measurement of the Environment (HOME) Inventory - Infant/Toddler version for family child care home settings. The HOME Inventory (Bradley, Caldwell, & Corwyn, 2003) is designed to measure the quality and quantity of stimulation and support available to a child in the family child care home environment. Forty-five items are scored in binary fashion (yes/no). Information used to score the items is obtained during the course of the visit by means of observation and semi-structured interview. Items are clustered into six subscales, but high endorsement rates within subscales lead the NICHD research team conduct factor analyses. Principal components analyses with Varimax rotation of responses (from the 24-month visit only) indicate that a three factor solution fits the data best: (a) Learning materials, e.g., "Push or pull toy available" (α = .76), (b) Responsivity/involvement e.g., "Caregiver responds verbally to child's vocalizations" (α = .65), (c) Acceptance e.g., "Caregiver does not shout at child" (α = .74).

Caregiver characteristics.

The caregiver demographic characteristics, beliefs about raising children and concerns about providing care and other measures were collected as part of the caregiver

questionnaire administered during the interviewer observation visit to the family child care home or center.

General education. This variable was part of the observer-administered interview that reflects the caregivers' level of general education without regard to the field of study. It is a six level variable ranging from (1) Less than high school, (2) high school graduate, (3) some college/AA, (4) BA degree, (5) some graduate work, to (6) advanced degree.

Caregiver formal training. This variable was part of the observer-administered interview. It measures the caregivers' highest level of formal training in child development or early childhood education. There are 5 levels: (0) none or missing, (1) high school, (2) certification or a degree in a closely related field, (3) some college, (4) college or graduate degree. In the full sample, the majority of caregivers had no formal training (52%). The remaining caregivers had certification, a degree in a related field or adult/ vocational training (14%) or some college training (23%). Very few had high school training (6%) or a graduate degree (5%)

Recent training. This one item measure asks if caregivers received any training or education related to child care, child development, or early childhood education in the last year. Values for this variable are (0) no recent training and (1) recent training. The majority of caregivers had not received any formal training in the past year (62%).

Beliefs About Raising Young Children (Modernity Scale; Schaefer & Edgerton, 1985). This is a 30-item, self-administered questionnaire is scaled on a 5-point Likert scale from 1 (strongly disagree) to 5 (strongly agree). Items that indicate progressive child rearing beliefs are reflected. The total score is the sum of each item (range from 30

to 150) with higher scores indicating more traditional child rearing beliefs. Cronbach's alpha = .89.

Taking Care of Young Children. This questionnaire is intended to measure caregiver perceptions the concerns and rewards associated with taking care of young children. Twenty-eight items were rated on a four-point Likert scale ranging from 1 ("not at all" a concern/reward) to 5 ("extremely a" concern/reward) or marked as "does not apply". Principal component analysis indicates there are four factors that account for 48% of the variance. The factors are as follows: (a) Emphasis on work characteristics, e.g. "How much is it a concern that there is little opportunity for career advancement?" (6 items; $\alpha = .86$), (b) emphasis on caring for children, e.g. How much is it a reward to see the children's happy faces?" (8 items; $\alpha = .72$), (c) emphasis on working with children, e.g., "How much is it a concern that children cry a lot" (6 items; $\alpha = .75$), and (d) emphasis on caregivers own needs, e.g. "How much is it a reward the hours fit your needs?" (5 items; $\alpha = .72$).

Caregiver Professionalism is a composite of questions asked during the caregiver interview. It is the sum of items reflecting their (a) membership in a professional organization, (b) their preference for other work (reflected), (c) expected longevity of the child care career, and (d) professional reasons for providing child care (3 items for center based and 5 for home based caregivers). The professional reasons for home based caregivers were weighted by 3/5 to equate the contribution of this variable in the composite variable. Scores ranged from 1-12; the average score was 8, indicating a moderate level of professionalism.

Depression. The Center for Epidemiological Studies Depression Scale (CES-D; Radloff, 1977) is one of the most widely used and validated measures of depressive symptomatology for non-clinical samples. Caregivers completed this 20-item measure of their own depressive symptoms on a scale from 1-3. The score is the sum of all items, with higher scores denoting higher levels of depressive symptoms. Scores of 16 or higher have clinical significance. Cronbach's alpha = .81.

Behavioral Processes

To assess interactions between caregivers and children, the study investigators developed the Observational Record of the Caregiving Environment (ORCE). The ORCE is a measure of behavioral frequencies and qualitative assessments comprising interactions which, based on past theory and research, are believed to reflect child care quality. The ORCE can be used, without modification, across a variety of child-care settings including centers and child care homes. However, because the characteristics of positive caregiving differ by age, the ORCE was adapted from earlier versions to be a measure of appropriate caregiving and setting interactions at 24 months.

Each 44-minute observation cycle of recording consists of three, 10-minute intervals of continuous recording, broken by 2-minute intervals for qualitative notetaking, followed by a 10-minute interval of observation focused on global qualities of behavior. Four cycles of observation were collected in two separate visits to the child care setting.

Behavior Scales. The behavior variables were assessed in two cycles on each of two different days for a total of four cycles. Each cycle consisted of thirty 30-second segments of observation followed by 30 seconds of recording time. Thirty-one

behavioral items were then summed across segments and cycles to yield a total number of segments within which a behavior occurred. Most children had a total of 120 segments of information. Each behavioral variable was then scaled to represent the number of times in 60 seconds that a particular behavior occurred. These behavioral variables comprised child individual behaviors (e.g., Unoccupied/Transition, Watch TV, Activity with Objects), child-peer interactions (e.g., Negative Interaction with Other Children, Activity with Children Only) and child-caregiver interactions (e.g. Caregiver Reads Aloud to Child, Caregiver Responds to Child's Talk). The descriptive statistics for each variable are summarized in Table 1.

Control Variables (Child Characteristics)

These four variables were chosen to control for children's characteristics that might be expected to explain their behavior in the child care setting or that might evoke variations in caregiving processes.

G*ender*. Gender was reported by the mother report at the one-month home visit. Values were originally (1) male and (2) female. A recoded variable representing the gender of the child is included in all analyses: (0) male and (1) female.

Race. Race was assessed by mother report at the one-month home visit. The values for this variable are (1) American Indian, Eskimo, Aleutian (2) Asian/Pacific Islander, (3) Black/ African American, (4) White, (5) Other. This variable was reduced to a dichotomous measure: Non-White = 0; Non-Hispanic White = 1.

Bayley Scales of Infant Development- 15 months. The Bayley Scales (Bayley, 1969) are a laboratory-administered measure that provides an evaluation of a child's

current developmental status by evaluating sensory-perceptual acuities and discriminations; memory, learning, and problem solving; early verbal communication; and the ability to form generalizations and classifications. This measure is the total score when children were 15 months old.

Temperament- 6 months. This 55-item measure was adapted from the Carey & McDevitt (1978) Infant Temperament Questionnaire. Items include "My baby accepts change right away" and " My baby resists changes in feeding schedule". Responses range from 1 (almost never) to 6 (almost always). This mother-report measure has five distinct subscales: Approach, Activity, Intensity, Mood, and Adaptability. Positive items were reflected; higher scores indicate the child has a more difficult temperament. Cronbach's alpha on the full sample = .81.

Data Reduction

Both practical and theoretical concerns drove a rather extensive effort to reduce the available data into summary variables. Factor analysis was used to reduce the 31 individual count variables from the ORCE behavior scales because each of the count variables was too rare to function effectively as a dependent measure of child and adult behaviors in the caregiving setting. There were theoretical reasons for creating new subscales from the center and home versions of the Assessment Profile and Child Care HOME. Quite often aspects of the caregiving environment and the qualities of the caregiver were combined in the same a *priori* subscales, which would have prevented an effective test of their independent influence on the behavioral variables. In addition, some of the existing items and subscales on the Assessment Profile and the Child Care

HOME were measures of behavioral interaction, which are considered dependent variables in this study. Finally, some of these a priori subscales have low internal reliability. Rather than accept the weaknesses of these global quality measures, items and scales (both existing and created) were clearly distinguished as either environmental or caregiver determinants of behavior or as the behavioral processes themselves.

Dependent Variables

ORCE behavior scales. Exploratory factor analysis was conducted on the 31 behavioral items that comprise the ORCE behavior scales using scores from the both the home- and center-based child-caregiver dyads (N = 361). The analysis used a principal factors method with a PROMAX rotation, which allowed the resulting factors to be correlated with one another. These analyses resulted in 10 factors with eigenvalues over 1, however only the first five of these factors accounted for at least 5% of the total variance. The summary scores created from items that comprised four of these factors had acceptable measures of internal consistency and were retained for the further analysis. The final scales were sums of each of the items that loaded on the retained factors. Cronbach's Alphas are for the entire sample; however descriptive statistics are summarized by setting in Table 1.

1. *Positive engagement.* Positive engagement (α = .89), is the sum of 7 items that measure positive verbal and non-verbal interactions between the child, caregiver(s) and peers. Items include: (a) Child talk, (b) caregiver responds to child talk, (c) caregiver speaks positively to child, (d) caregiver asks questions of child, (e) other talk to child, (f) mutual exchange, and (g) activity with child or adult.

2. *Directive interactions.* This subscale, (α = .74), is the sum of two items that represent a caregiver restrictiveness or directiveness and two that represent children's compliance or refusal of adult instructions. Items include (a) Caregiver gives directions to child, (b) caregiver negative or restrictive actions, (c) child complies with adult, and (d) child says 'no'/ refuses.

3. *Child negative/aggressive.* The subscale, (α = .75), is the sum of three items that represent children's negative and aggressive interactions with peers and other persons in the environment. Items include: (a) Negative interaction with other child, (b) negative non-aggressive act, and (c) physical aggression.

4. *Child positive/prosocial.* This subscale, (α = .59), is the sum of three items that represent children's positive social interactions, primarily with peers, but also other persons in the environment. Items include: (a) Mutual pretend play, (b) positive or neutral interaction with other child, and (c) prosocial act.

5. *Child watching television.* Although this behavior is somewhat rare and did not load with any other factors in the analyses, this single item was retained as a dependent variable because of its theoretical importance. The American Academy of Pediatrics recommends very limited television viewing for children up to 24 months of age and very little is known about the amount and type of television viewing in child care settings. These analyses will allow us to examine which types of home-based environments and caregivers are more likely to promote television viewing (at least in the presence of an observer). This behavior was too rare in child care centers to be included in any of the analyses.

6. *Child watching/unoccupied/transition.* This single item also shared little variance with the other behavioral variables and loaded on its own factor. Like television viewing, this variable was retained primarily because of its theoretical importance with regard to learning opportunities in the caregiving setting. Children who have difficulty finding and focusing on an interesting activity because of a chaotic environment, the lack of interesting materials or frequent transitions may not be able to benefit from the learning opportunities provided by interactions with adults, peers and materials in the caregiving setting.

Recommended teaching practices. These two scales are the sum of 7 items (α = .64) from the learning environment and curriculum subscales of the Assessment Profile for Family Child Care and the sum of 7 items (α = .73) from the from the curriculum subscales of the Assessment Profile for Early Child Care Programs. When these measures were subjected to factor analysis they did not load together on a unique factor, but as part of a factor that appeared to indicate "global" quality. These items were selected to compose this subscale because they represent behaviors that are generally accepted as "best practices" in the care and education of young children. Each item is also distinguishable as observable caregiver behavior in the caregiving settings, the prediction of which was the main goal of this study.

In the home-based setting, this scale comprises of the following items: (a) directions are given in clear, understandable terms, (b) some activities are demonstrated in an organized sequence of steps, (c) children are actively encouraged to participate in activities, (d) children are asked to remember specific facts (e) children are required to

solve problems, (f) caregiver looks at books with children, and (g) caregiver allows child to make choices. It is important to note that unlike the ORCE measures, these behaviors were counted toward the total score even if not directed at the target child. The center version of this scale included first five items (a-e) of this scale plus two unique items: (h) children are allowed to work at their own pace, (i) activities are modified to accommodate different skill levels. In order to create this scale from the center-based observations, it was necessary to impute the mean (M = .65) for two cases on item (h) children are allowed to work at their own pace. There were no missing data among the home-based providers.

Caregiver scolds/punishes child. This measure is sum of the reflected scores from the 6-item Acceptance subscale from the Child Care HOME, which was created based on factor analyses conducted by the NICHD ECCRN (α = .74, full sample). Scores originally indicated a lack of punishing and restrictive behaviors. High scores now indicate a higher frequency of these behaviors. Original items include (a) caregiver does not shout at child, (b) caregiver does not express annoyance or hostility with the child, (c) no more than one instance of physical punishment in the last week, (d) caregiver does not scold or criticize the child during the visit, (e) caregiver neither slaps nor spanks the child during the visit, (f) caregiver does not interfere or restrict the child 3 or more times during the visit.

Independent variables

Characteristics of the Environment

Materials (centers). This measure is the sum of the 3 items (α = .46) from the curriculum subscale of the Assessment Profile for Early Child Care Programs that represented the availability of certain materials in the center setting. Items include (a) a minimum of 3 types of manipulatives, (b) a minimum of 3 types of dramatic play materials, and (c) a minimum of 3 types of language materials.

Materials (child care homes). This subscale comprises 10 of the 11 items from the existing Learning Materials subscale as developed through factor analysis by the NICHD ECCRN. The item "caregiver invests maturing toys with personal attention" was removed because it represents caregiver behavior rather than the availability of particular toys and learning materials. Cronbach's alpha after the removal of this item = .75.

Health (centers). This measure is the sum of the 7-item Safety and Health subscale (α = .46) from the Assessment Profile for Early Child Care Programs. It has been renamed *Health*, because each item is an indicator of practices that minimize the transfer of communicable disease and none are indicators of the safety of the setting. These items are (a) teacher washes her hands with soap and water before handling food and after assisting with toileting, (b) children wash hands with soap and water before eating and after toileting, (c) personal items (e.g. individual or disposable towels) available for children, (d) children have individual nap linens, (e) nap linens washed weekly, (f) disinfectant solution used in diapering area after each use, and (g) diapering area is free of persistent odors. In order to avoid loosing cases due to missing data, the mean was imputed for cases across several items: items "b", "c", "d" 1 case each, item "e" 4 cases, and item "f" 3 cases.

Safety (child care homes). This scale includes 17 items (α = .69) from the original 27-item Safety and Health Subscale. These items characterize a caregiving environment that is free from many of the household items that are known to be hazardous to young children. These items are (a) Dangerous items in the bathroom out of children's reach, (b) locks on bathroom out of reach, (c) electrical appliances and cords out of reach, (d) handles of pots and pans face in on the stove, (e) knives and matches out of reach, (f) cleaning agents are out of reach and away from food preparations surfaces, (g) cribs located out of reach, (h) dangerous objects in other areas of the house are stored out of reach, (i) pathways are free of hazardous objects, (j) heaters and fans protected from reach, (k) electrical outlets covered, (l) electrical cords secured, (m) furniture and equipment in good repair, (n) home in good repair, (o) written emergency procedures posted, (p) emergency numbers are posted and current, and (q) stairs are safe. In order to avoid loosing cases in the creation of the scale, the mean was imputed for 1 case on item "f', 2 cases on item "l", and 3 case each on items "p" and "q".

Schedule (centers) This scale is the sum of 8 of the 10 items on the *a priori* Scheduling subscale from the Assessment Profile for Early Child Care Programs. (α = .83). These items reflect efforts to provide a balance of quiet and active, small and large group activity as would be recommended by current best practice standards. Two of the original items (a) schedule posted, and (b) file of previous lesson plans were dropped because they appeared to be rather distal predictors of what the child would actually experience in the classroom. Included items are (a) written schedule reflects quiet activities, (b) quiet activities follow active ones, (c) outdoor activities scheduled, (d)

opportunity for free play and discovery time, (e) daily time when teacher works with small groups (3-8) children, (f) daily time when teacher works with the whole group, (g) activities reflect that quiet activities follow active ones, (h) classroom activities reflect tha teacher works with small groups of children. In order to avoid loosing cases in the creation of this scale, the mean was imputed for 1 case on each item "a" through "f".

Schedule (child care homes). This 3-item subscale is one of the *a priori* scales on the Assessment Profile for Family Day Care (α = .33). These items reflect efforts to provide a balance of quiet and active, small and large group activity as would be recommended by current best practice standards. Items are (a) quiet and active activities follow active ones, (b) children have daily opportunity for outdoor activities, and (c) caregiver spends one-on-one time with the target child. There were no missing data among these items.

Caregiver characteristics.

There are 13 measures of caregiver characteristics (12 among center caregivers), many of which are highly correlated. In order to produce a clear picture of the way in which these qualities affect child and caregiver behavior in the caregiving setting, exploratory factor analysis was used to identify the ways in which these variables were interrelated. The results of this analysis were used to limit the number of predictor variables, thereby saving degrees of freedom and reducing problems of multicollinearity in the regressions. Five distinct factors emerged with eigenvalues over 1.0. The pattern of factor loadings was almost identical for home- and center-based caregivers, but the amount of variance accounted for by each factor differed somewhat.

In each setting, there was a distinct factor that had high positive loadings for caregiver age, caregiver years of experience and (in child care homes) a high negative loading for the presence of the caregivers' own children, indicating that older, more experienced caregivers are less likely to have their own children present. Because there is no measure of the presence of the caregivers own children among center caregivers, and there is no theoretical reason to be concerned about the age of caregivers, *years of experience* was used to represent this factor in the regressions.

A second factor accounted for high loadings from formal training, education and a negative loading from traditional childrearing beliefs. Previous research suggests that education may exert its influence on caregiver behavior through modern childrearing beliefs. Because childrearing beliefs could be considered to be more proximal to teacher behavior in the child care setting than education, which could have been received many years prior to the observations, *caregivers beliefs about childrearing* was used in the regression analyses. Although *formal training* also loads on this factor, it was retained in the analyses because of its theoretical importance.

The third factor was one that represented positive loadings for caregivers concerns about caring for young children, concerns about work characteristics and a negative loading from caregiver depression. These two subscales from Taking Care of Young Children were summed to create a measure called *concerns* which was used in the regression analyses. The interpretation of their contribution will have to account for the fact that these concerns are associated with lower levels of depression among caregivers.

A fourth factor accounts for the contribution of *professionalism* and *recent*

training. The pattern of results is somewhat different across caregiving settings. Among home based caregivers, higher levels of professionalism are associated with higher levels of recent training. However in center-based settings, the loading for recent training is in the opposite direction from professionalism. This may be the result of the fact that ongoing professional development is required of most center-based caregivers and is not a reflection of their professional orientation as it is among home based caregivers (professionalism and recent training are uncorrelated among center based caregivers, see Table 2). In order to avoid a conflict in interpretation, both *professionalism* and *recent training* are retained in the regression analyses.

Finally, there was a fifth distinct factor that represented high loadings on the measures about caregiving meeting caregivers' own needs and caregivers finding working with children rewarding. These two scores were summed to form a new variable called *rewards*. High scores on this measure indicate that the caregiver finds that providing child care is personally and/or professionally satisfying. The independent variable correlation matrices are presented in Tables 2 and 3 for child care homes and centers respectively. The correlations of each independent variable with each dependent variable are presented in Tables 4 and 5 for centers and child care homes.

Imputation of Missing Data

In order to make accurate comparisons of model fit in the regression analyses, it was necessary to impute missing data among the independent variables. There was complete data on each of the observer collected measures in both child care homes and (N = 184) and centers (N = 177); however, there were missing data from each of the

caregiver self-report measures and two of the control variables (Bayley and Temperament). In each instance, missing values were replaced with the mean score on the given variable within each caregiver group or the mean from this subsample of children. Flags were inserted in the data set to mark the use of imputed values and these flags were included in preliminary analyses. Although the flags were occasionally significant, there were no instances in which the flag of a significant predictor was simultaneously significant itself. As a result, these flags were not included in the final set of regressions, which saved 11 degrees of freedom in both home and center based analyses. The number of missing cases and imputed values are summarized in Appendices B and C. Missing values were not imputed for any of the dependent variables, which resulted only in the loss of two cases in the model test of "caregiver scolds/punishes" in the analyses for home based caregivers.

Results

Hierarchical Regressions

Each of the behavioral process measures was examined with OLS hierarchical regression using the REG procedure in SAS. Each MODEL statement was followed with a TEST statement that evaluated the improvement of model fit with the addition of each new set of predictors. Analyses were conducted separately for centers and child care homes; results are summarized in Tables 6 and 7 respectively. The first step in each analysis was to enter a block of four child characteristics as controls. This block comprised the dichotomous measure of child sex (male = 0; female = 1); child race (Non-White = 0; Non-Hispanic White = 1); 15-month old total score on the Bayley Mental Development Index (MDI); and child temperament at 6 months.

The next step was conducted twice, first with a test of the improvement of model fit after the addition of only the environment block and then a test of improvement after adding only the caregiver block. These *F* tests are included in each column of Tables 6 and 7 directly under the second and third block rows. The environment block comprised four measures of the caregiving environment including: materials, health (centers) or safety (homes), schedule and observed child-adult ratio. The caregiver block included seven caregiver characteristics: professionalism, concerns about providing child care, traditional beliefs about childrearing, the rewards of providing child care, years of experience, formal training, and recent training.

The third step was an evaluation of the full model with all 15 control, environment, and caregiver predictors. The full model was run twice, the first time with

a TEST statement evaluating the improvement of model fit after adding the caregiver block, and a second time with a TEST statement evaluating fit improvement after adding the environment block. The results of these *F* tests follow the full model (the fourth block row) at the bottom of each column in Tables 6 and 7.

Child Care Centers

Positive engagement. As shown in Column 1 of Table 6, child controls did not significantly predict positive engagement F (4, 172) = 1.84 *ns,* although there was a trend toward the significant positive influence of the 15-month Bayley MDI, suggesting that children with higher scores on this measure were more positively engaged in verbal and nonverbal interactions with caregivers and others in the classroom. The addition of the environment block was a significant improvement over the child block alone F (8, 168) = 8.05, $p < .001$; $\Delta R^2 = .24$, primarily because of the influence of lower child-adult ratio (B = -7.49, $p < .001$) and better health practices in the classroom (B = 5.69, $p < .01$).

The addition of the caregiver block to the controls also resulted in a significant improvement in model fit over the controls F (11, 165) = 4.46, $p < .001$; $\Delta R^2 = .19$. Higher levels of positive engagement are predicted by higher levels of caregiver professionalism (B = 4.24, $p < .01$) and by less traditional childrearing beliefs (B = -.54, $p < .01$). There is also a trend for higher levels of formal training to be associated with more positive engagement in the caregiving setting (B = 3.50, $p < .10$). There was a trend toward significance for child race, indicating that non-white children were less likely to be positively engaged in child care center classrooms (B = -14.23, $p < .10$). .

The full model was also significant F (15, 161) = 6.48, $p < .001$; $R^2 = .38$. Both the caregiver block and the environment block were significant contributors in explaining the frequency of positive engagement in child care center classrooms [Model test of caregiver block: F (7, 161) = 3.67, $p < .01$; environment block: F (4, 161) = 9.51, $p < .001$]. Regression coefficients for health, child-adult ratio and traditional beliefs declined slightly, but did not change substantially in the full model, indicating an additive influence of the characteristics of the caregiver and the environment in predicting positive engagement. However, the coefficient for professionalism was reduced to a trend and the coefficient for formal training was reduced to non-significance while the coefficient for concerns *increased* to the level of a trend indicating a some of covariance between these caregiver characteristics and the caregiving environments in which those caregivers work.

Directive interactions. The child block does not significantly predict directive interactions between the child and the caregiver F (4,172) = 1.21 *ns*, (see Table 6, column 2). The environment block does not add significantly to the prediction of directive interactions, F (8, 168) = 1.00, *ns*; $\Delta R^2 = .02$, nor does it reduce the coefficient or significance level of child race. The caregiver block also fails to improve model fit, F (11, 164) = 1.41, *ns*; $\Delta R^2 = .06$, although the coefficients for caregiver professionalism ($B = .84$, $p < .05$) and recent training ($B = 3.37$, $p < .05$) is positively associated with these interactions.

The full model is not a significant predictor of these directive interactions, F (15, 161) = 1.22, *ns*, which suggests that these behaviors were not adequately predicted by the

variables included in this model. However, there is an indication that directive interactions may be more frequent among non-white children, when caregivers have a more professional orientation to their work, and when caregivers have engaged in recent training. Although there was a reduction in the significance level for caregiver recent training in the full model, the coefficients for each of these predictors were not reduced with the addition of the environment block, which suggests that their influence on directive interactions may operate independently from the influence of the environment.

Child negative/aggressive. In part, because children's negative/aggressive interactions were somewhat infrequent during the observation visits (range 0 - 16.5; *Md* = 3), there are no significant predictors either in the regression analyses, full model F (15, 161) = .81, *ns* or in any of the preceding steps (see Table 6 column 3). There was a trend for children's negative and aggressive interactions to be more frequent in classrooms that were presided over by caregivers with more formal training (B = .39, $p < .10$), however it is difficult to draw any substantive conclusions about the relative influence of the caregivers and the environment based on these results. The best predictors of these interactions have not been accounted for in these analyses.

Child positive/prosocial. The child block does not significantly predict the frequency of children's positive and prosocial behaviors, F (4, 172) = .91, *ns*, but the addition of the environment block adds significantly to their prediction F (8, 168) = 5.35, $p < .001$; $\Delta R^2 = .18$. This improvement is accounted for, in part, by a negative relation with recommended scheduling practices (B = -.88, *se* = .37, $p < .05$) and a positive association with child-adult ratio (B = 2.06, *se* = .43, $p < .001$). There caregiver block

significantly improves model fit over the control block, F (7, 165) = 2.08, $p < .05$, although the model itself was not significant F (11, 165) = 1.67, $p < .10$ ($\Delta R^2 = .08$). This improvement was accounted for, in part, by a trend for caregivers who find their work less rewarding to preside over classrooms with more positive child behaviors.

The full model is a significant predictor of children's positive and prosocial behaviors F (15, 161) = 3.42, $p < .001$; $R^2 = .24$. In the full model, the coefficients for recommended scheduling practices, child-adult ratio, and caregiver rewards were essentially unchanged. Tests of model fit indicate that the environment block is a more important predictor of these interactions, but the lack of change in the value of regression coefficients is evidence that the association between the two blocks could be characterized as independent.

Recommended teaching practices. The child block did not significantly predict the frequency of active teaching behavior by center-based caregivers F (4, 172) = .95, *ns*, but the environment block resulted in a significant improvement of model fit F (8, 168) = 7.60, $p < .001$; ($\Delta R^2 = .25$). Recommended teaching practices are predicted by the availability of learning materials ($B = .27$, *se* = .10, $p < .05$), adherence to health practices ($B = .28$, *se* = .05, $p < .01$), and recommended scheduling practices ($B = .22$, *se* = .05, $p < .001$). The caregiver block does not significantly improve model fit over the controls alone, F (11, 165) = .94 *ns*, neither are these teaching practiced associated significantly associated with any of the individual caregiver characteristics.

The full model was a significant predictor of recommended teaching practices, F (15, 161) = 4.28, $p < .001$; $R^2 = .29$. It is clear that environmental predictors account for

the majority of the variance in predicting these teaching practices behaviors. These results suggest both that the environment makes an independent contribution to the prediction of these behaviors and that any relevant caregiver characteristics are not included in these models.

Watching/unoccupied/transition. The child block does not significantly predict the frequency of watching, being unoccupied or being in transition, F (4, 172) = .77, *ns*. The addition of the environment block does not significantly improve the prediction of waiting/unoccupied/transition, F (8, 168) = .77, *ns*, ΔR^2 = .02, nor were any of the individual environment variables significant predictors of this behavior. The addition of the caregiver block significantly improves model fit over the variance accounted for by the controls F (11, 165) = 2.54, $p < .01$,ΔR^2 = .13. This is explained, in part, by negative relations with caregiver professionalism (B = -.99, *se* = .32, $p < .01$) and recent training (B = -2.77, *se* = 1.31, $p < .05$) and a positive relations with caregiver concerns (B = 1.26, *se* = .56, $p < .05$) and caregiver formal training (B = 1.03, *se* = .46, $p < .05$).

The full model significantly predicts the frequency of children watching, being unoccupied or in transition F (15, 161) = 2.00, $p < .05$; R^2 = .16. The test of model fit shows that the environment block does not significantly improve the prediction of these child behaviors; they are primarily accounted for by caregiver qualities. Coefficients for caregiver professionalism, concerns, formal and recent training were essentially unchanged in the full model indicating that the effect of these caregiver characteristics operate relatively independently of the effect of the environment.

Child Care Homes

Positive engagement. The child block does not significantly predict the frequency of positive engagement in child care homes, F (4, 179) = 1.29, *ns*, but there was a trend for children who had more difficult temperaments at 6 months to engage in more frequent positive interactions (B = 16.61, *se* = 9.68, $p < .10$). The addition of the environment block significantly improves the prediction of positive engagement in child care homes, F (8, 175) = 10.76, $p <. 001$; $\Delta R^2 = .30$. Children are more likely to be positively engaged in child care homes with recommended scheduling practices (B = 17.01, *se* = 4.02, $p <$ .001) and lower child-adult ratios (B = -13.06, *se* = 1.94, $p < .001$).

The caregiver block is also a significant improvement over the controls, F (11, 172) = 2.04, $p < .05$; $\Delta R^2 = .09$. There are trends toward higher rates of positive engagement in child care homes in which caregivers have more years of experience (B = .45, *se* = .26, $p < .10$) and have no recent training (B = -15.30, *se* = 8.28, $p < .10$). The full model is a significant predictor of positive engagement F (15, 168) = 6.42, $p <. 001$; $R^2 = .37$. However, after accounting for the contribution of the environment, the caregiver block is no longer significant and the coefficients for caregiver years of experience and recent training were reduced substantially. This pattern of relation suggests a high level of covariance between caregiver characteristics and the environmental predictors of positive engagement.

Directive interactions. The child block does not significantly predict the frequency of directive interactions between 24-month olds and their caregivers in child care homes, F (4, 179) = 1.10 *ns*, nor does the addition of the environment block significantly improve model fit F (8, 175) = 1.35, *ns*; $\Delta R^2 = .04$. However, there is a

trend toward a higher frequency of directive interactions when child-adult ratios are lower (B = -.89, *se* = .45, $p < .10$). There is a trend toward the improvement of model fit with the addition of the caregiver block, F (11, 172) = 1.64, $p < .10$; $\Delta R^2 = .08$). This trend is partially accounted for by the increased frequency of directive interactions among home-based caregivers who find their work with children less rewarding (B = -2.19, *se* = .85, $p < .05$) and those who have less formal training (B = -1.22, *se* = .63, $p < .10$).

There is a trend for the full model to significantly predict directive interactions in child care homes F (15, 168) = 1.55, $p <. 10$; $R^2 = .12$. The coefficients for caregiver rewards and formal training are unchanged after the addition of the environment block. Although the best predictors of these interactions are not included in this model, there is some evidence that the relation between the characteristics of the caregiver and the environment may make independent contributions to the prediction of directive interactions.

Child negative/aggressive. The child block does not significantly predict the frequency of children's negative and aggressive behavior in child care homes, F (4, 179) = 1.12, *ns*, although there is a slight trend for these behaviors to be more frequent among children who scored higher on the Bayley MDI at 15 months (B = .03, *se* = .02, $p < .10$). The addition of the environment block improved prediction of children's negative and aggressive behaviors, F (8, 175) = 3.25, $p <. 001$; $\Delta R^2 = .10$, primarily through its positive relation with child adult ratio (B = .61, *se* = .15, $p < .001$). The addition of the caregiver block makes a significant improvement to model fit over the control block F (11, 172) = 1.98, $p <. 05$; $\Delta R^2 = .08$. Children's negative and aggressive behaviors are

more frequent in child care homes in which the caregivers have fewer concerns about their work (B = -.87, *se* = .30, $p < .01$). There is also a trend toward children's more frequent negative and aggressive behaviors among those whose caregivers find their work less rewarding (*B* = -.49, *se* = .30, $p < .10$).

The full model is a significant predictor of the frequency of negative and aggressive behaviors, F (15, 168) = 2.57, $p <. 001$, $R^2 = .19$. When all variables are included in the model, the caregiver block is no longer a significant contributor to overall model fit; however the regression coefficients for caregiver concerns and rewards are essentially unchanged. This pattern of association offers mixed support for the possibility of an independent contribution of the caregiver that cannot be completely explained by the covariance of caregiver and environmental features.

Child positive/prosocial. The child block does not significantly predict the frequency of children's positive and prosocial behaviors in child care homes, F (4, 179) = 1.32, *ns*, although these behaviors are more likely among children who had less difficult temperaments at 6 months (B = -6.78, *se* = 2.90, $p < .05$). The addition of the environment block significantly improves the prediction of children's positive and prosocial behavior, F (8, 175) = 7.67, $p <. 001$; $\Delta R^2 = .23$. These positive behaviors are more likely when higher child-adult ratios are higher (B = 3.99, *se* = .69, $p < .001$) and when the recommended scheduling practices are not used (B = -3.40, *se* = 1.43, $p < .05$)

The caregiver block significantly improves the prediction of positive and prosocial behaviors over the controls alone, F (11, 172) = 2.45, $p <. 001$; $\Delta R^2 = .09$, primarily through a positive association with caregiver recent training (B = 7.88, *se* =

2.76, $p < .01$) and a negative relation with caregiver concerns (B = -3.05, *se* = 1.42, $p <$ .05). The full model is also a significant predictor of children's positive and prosocial behaviors in child care homes, F (15, 168) = 4.80,$p <$. 001; R^2 = .30; however, the caregiver block is no longer a significant predictor of these positive behaviors and the coefficients for caregiver concerns and recent training are reduced to nonsignificance. This indicates that the prediction of children's positive and prosocial behaviors is at least partially accounted for by the covariance between the characteristics of the caregiver and those of the environment.

Recommended teaching practices. The child block does not significantly predict caregivers' teaching practices in child care homes, F (4, 179) = .64, *ns*; *h*owever, the environment block significantly improves the prediction of these behaviors F (8, 175) = 17.66, $p <$. 001; ΔR^2 = .43. Recommended teaching practices are more frequent in home-based settings that are safer (B = .10, *se* = .04, $p < .01$), that have a more formal schedule (B = 1.14, *se* = .13, $p < .001$), and that have more appropriate play materials (B = .21, *se* = .05, $p < .001$).

The caregiver block significantly improves model fit over controls although the block itself is not a significant predictor of recommended teaching practices F (11, 172) = 1.61, *ns*; ΔR^2 = .08. Within the caregiver block there is evidence that these behaviors are more likely among caregivers with formal training (B = .26, *se* = .12, $p < .05$). The full model is a significant predictor of recommended teaching practices in child care homes, F (15, 168) = 9.95, $p <$. 001; R^2 = .47; however, when all variables are included in the model, the coefficient for formal training is reduced to nonsignificance. This suggests the

possibility of a considerable covariance between the characteristics of the caregiver and the environment in the prediction of this behavior.

Caregiver scolds/punishes. The child block did not significantly predict the frequency of caregivers' scolding and punishing behavior toward 24-month old children in child care homes, F (4, 177) = 1.20, *ns*. The environment block significantly improves model fit F (8, 173) = 8.56, p <. 001; ΔR^2 = .25. Scolding and punishing is more frequent in child care homes that are less likely to use recommended scheduling practices (B = -.78, *se* = .13, p < .001), that have higher child-adult ratios (B = .16, *se* = .06, p < .05), and have fewer developmentally appropriate play materials (B = -.09, *se* .05. p < .10). The caregiver block did not significantly improve the prediction of punishing and restrictive behavior over what was contributed by the controls, F (11, 170) = .95, *ns*; ΔR^2 = .03and there were no significant predictors within this block.

In the full model, F (15, 166) = 4.82, p < .001; R^2 = .30, the caregiver block still do not predict scolding and punishing behaviors, but their inclusion reduces the effect of ratio to nonsignificance. The only significant predictor in the full model is the use of recommended scheduling practices, although there is a trend to for scolding and punishing behaviors to be more common when there are fewer developmentally appropriate materials and when there are higher child-adult ratios. It is difficult to determine the precise relation between the caregiver and environment with regard to these behaviors. The caregiver block is not a significant predictor on its own (suggesting an independent relation), yet it reduces the coefficients for child-adult ratio (suggesting a

covariant relation). Unfortunately we can draw no firm conclusions due about the pattern of relations at this time.

Child watching television. The child block does not significantly predict the frequency of 24-month old children's television viewing during the observer visit to child care homes, F (4, 179) = .87, *ns*; and the environment block does not add any significant variance to this prediction, F (8, 175) = .97, *ns*; $\Delta R^2 = .02$. The caregiver block added significant improvement to model fit over the controls alone, F (11, 172) = 2.51, $p < .01$; $\Delta R^2 = .12$. Television viewing is significantly more likely in child care homes in which the caregivers have more traditional childrearing beliefs (B = .11, *se* = .05, $p < .05$) and when they have more recent training (B = 3.38, *se* = 1.51, $p < .05$). There are also trends toward more frequent television viewing when caregivers have more concerns about providing child care (B = 1.42, *se* = .78, $p < .10$) and when they have less formal training (B = -1.10, *se* = .58, $p < .10$).

The relations between the caregiver and the frequency of television viewing are essentially unchanged in the full model, which suggests that information about the environment does not change the predictive power of caregiver traits. Although there could be some unmeasured environmental variable that might temper this association, it appears that the relation between the blocks is independent.

Watching/unoccupied/transition. The child block accounted for a significant amount of variance in the prediction of children watching, being unoccupied, or in transition in child care homes F (4,179) = 3.13, $p <. 05$; $R^2 = .07$. These behaviors are more frequent when children score lower on the 15 month Bayley MDI (B = -.11, *se* =

.04, $p < .01$). The environment block significantly improves the prediction of these behaviors F (8, 175) = 6.74, $p < .001$; $\Delta R^2 = .17$. Children are more likely to be watching, unoccupied or in transition in child care homes that are less safe (B = -.44, *se*, .17, $p < .05$), adhere less to recommended scheduling practices (B = -1.58, *se* = .62, $p < .05$), and that have higher child-adult ratios (B = 1.30, *se* = .30, $p < .001$). Interestingly, with the addition of the environment block, the effect of child race became significant (B = 3.70, *se* = 1.76, $p < .05$). After accounting for variation in the environment, White children are significantly more likely to be watching, unoccupied or in transition than Non-White children.

The caregiver block also significantly improved the prediction of watching, unoccupied and transition behaviors over controls alone F (11, 172) = 3.23, $p < .001$; $\Delta R^2 = .10$. These behaviors are more likely when caregivers have fewer concerns about providing child care (B = -1.19, *se* = .60, $p < .05$) and when caregivers had fewer years of experience (B = -.10, *se* = .04, $p < .01$). The full model is also a significant predictor of watching, unoccupied, and transition behaviors, F (15, 168) = 4.92, p < .001, and both the environment and caregiver blocks contribute significantly within the full model. Two of the regression coefficients (child-adult ratio, years of experience) were reduced somewhat in the full model, which indicates some covariance between the characteristics of the environment and the caregiver, but overall the two sets of variables appear to contribute independently to the prediction of watching, unoccupied and transition behaviors. There also appears to be important contribution of child factors in the prediction of this variable. In addition to the consistent negative association with the 15-

month Bayley, child race appears to be an important predictor of these behaviors even after accounting for a broad range of caregiver and environmental influences.

Discussion

Previous research on child care quality has clearly demonstrated that high quality child care is associated with positive developmental outcomes for young children's language, cognitive, and socioemotional development. However, global quality measures make it difficult to distinguish which aspects of care are responsible for these positive outcomes and the possibility of the selection of more competent children into higher quality care is not always addressed. A better understanding of the mechanisms by which child care effects children will inform future efforts to improve the quality of care children receive as efficiently and effectively as possible.

This study is designed to enhance our understanding of these mechanisms in two ways. First, it deconstructs global quality into it its most basic components: the human (caregiver) and non-human (environment) aspects of the caregiving setting in order to determine if the two contribute independently to behavioral processes in the caregiving setting. Distinguishing these features of care allows us to understand the importance of the personal resources that child care providers bring to the setting and the importance of the setting itself, after accounting for the contributions of the caregiver. Second, this study examines the moment-to-moment behaviors and interactions of children and their caregivers in the child care setting. Understanding the link between the qualities of the caregiver and the environment and these behavioral processes will enrich our understanding of the link between global child care quality and children's development.

Do the characteristics of the caregiver and the caregiving environment influence child and adult behavioral processes independently?

Child Care Centers

Evidence for independent effects. The clearest evidence for the independent influence of environmental and caregiver characteristics occurs in the prediction of the frequency of child positive engagement, arguably one of the most important processes for the development of 24 month old children, in the child care center setting. Sets of environmental and caregiver predictors significantly predict positive engagement independently and then continue to contribute to the prediction of these behaviors when included in a model together. There is also evidence for independent contributions of environment and caregiver factors to children's positive and prosocial behavior, the frequency of children's watching, unoccupied and transition behaviors, and caregiver use of recommended teaching practices. In each of these analyses, one set of variables significantly predicted behavioral processes independently and then remained significant in the full model.

In the case of children's positive/prosocial behaviors and caregivers' use of recommended teaching practices, the group of environmental variables is a significant predictor while the caregiver variables are inconsequential both independently and in the full model. With regard to children's watching, unoccupied, and transition behaviors, the reverse is true. These behaviors appear to be best explained by the characteristics of the caregiver, while environmental influences are negligible. These results suggest that the paths to each of these behavioral processes would be obscured by a global quality measure; in some cases, caregiver qualities are the primary determinants, and in some the environment is more important.

Evidence for covariance. There is no clear support for the covariance model in the prediction of adults' and children's behavioral processes in child care centers.

Unclear/mixed support. The hierarchical regression models fail to predict two of the behavioral processes examined in child care centers: directive interactions and children's negative and aggressive behaviors; however, the pattern of significance among the regression coefficients suggest that caregiver characteristics are the most important predictors of directive interactions between caregivers and 24-month-old children. It appears that directive interactions are best explained by caregiver professionalism and recent training (or some unmeasured but related traits) regardless of the environmental features of the child care centers, but the lack of a significant *F* test also suggests that the most important variable(s) in the prediction of this behavior are not included in these analyses. Unfortunately this appears to be the case with negative peer interactions as well; additionally, the rarity of these interactions make it impossible to draw any firm conclusions in support of the model at this time.

Child Care Homes.

Evidence for independent effects. The frequency children of children watching, being unoccupied or in transition and their rates of watching television offers support for the model of independent effects on behavioral processes in child care homes. In the case of watching, unoccupied and in transitional behaviors, both the characteristics of the environment and the caregiver predict independently and when in the model together. Only the caregiver traits significantly predicts television viewing both alone and in the full model. Features of the environment, including child-adult ratio, do not appear to

influence the likelihood of television viewing at all. Its clear that a global quality measure would obscure the prediction of television viewing, and that caregiver characteristics are particularly important in the prediction of this behavior.

Evidence for covariance. There is also considerable evidence for covariance between the characteristics of the caregiver and the home-based child care environment; three of the eight analyses of behavioral interactions offer clear support for the covariance model. For example, both the environment and caregiver blocks significantly predict children's positive engagement independently, but in the full model caregiver traits are reduced to non-significance. When both sets of predictors are in the model, the coefficients for caregiver years of experience and recent training are reduced substantially, indicating a high level of correspondence between those qualities and the environmental characteristics that continued to significantly predict children's behaviors. The pattern of relations between the two blocks of predictors was the same for children's positive and prosocial behaviors, and caregivers' use of recommended teaching practices. In each of these analyses, the previously significant caregiver qualities are reduced (or reduced to non-significance) in the full model indicating substantial covariance between the characteristics of the caregiver and the home-based child care setting she provides.

*Unclear/*m*ixed support.* Three of the home-based analyses failed to give clear support for the covariant or independent effects models. For example, the regression coefficients for caregiver rewards and formal training in the prediction of directive interactions are not reduced the full model, which suggests that there might be an independent influence of caregiver characteristics on these behaviors. Unfortunately,

neither the qualities of caregiver nor the environment are significant predictors of directive interactions either independently or in the full model. Apparently the best predictor(s) of these interactions are not included in the current model, so the relations between the two sets of predictors are still unclear.

A similar problem emerges in the prediction of caregiver scolding and punishing behavior. Caregiver qualities fail to predict this behavior independently or in the full model, but the addition of the caregiver block in the full model reduces the effect of ratio to nonsignificance. This suggests a level of covariance between caregiver characteristics and ratio that might be important in the prediction of scolding and punishing behaviors, but the lack of a significant *F* test makes it impossible to draw any firm conclusions.

It is also difficult to interpret the pattern of relations between the characteristics of home-based caregivers and environmental factors with regard to the prediction of children's negative and aggressive behaviors. Both sets of variables significantly predict these behaviors independently, but caregiver qualities become nonsignificant in the full model, offering support for the covariance model. Curiously, the regression coefficients within the set of caregiver predictors do not decline in the full model, which offers support for the independence model. It is important to note that these analyses are undoubtedly affected by the low frequency of children's negative and aggressive behaviors during the observation visits. Perhaps future analyses using data with higher frequencies of these behaviors will help elucidate the relation between the caregivers and the environment in the prediction of these types of interactions.

Do the relations between the caregiver and the environmental predictors operate similarly across center- and home-based caregiving settings?

The overall pattern of relations between blocks of environmental and caregiver characteristics are somewhat different across type of child care setting. As summarized in Table 8, the preponderance of evidence suggests that the independence model is the best way to conceptualize the relations between caregivers and the caregiving environment in the prediction of behavioral processes in child care centers. The pattern of relations is more varied and complex in the prediction of behavioral processes in child care homes.

The fact that there is support for the covariance model among home-based settings is not entirely unexpected. All of the experiences, beliefs, training, professional motivations and other personal qualities of home-based caregivers directly influence the way they organize their schedule, decide which materials and activities to provide, and the number of children for whom they will care. This is less often the case in centers. There is most certainly *some* covariation between the types of caregivers that work in particular centers and the features of those centers; however, it seems quite clear that depending upon the behavioral processes in question (e.g., television viewing, watching/ unoccupied/transition), the independence model is also a useful way of conceptualizing the relations between caregivers and their home-based child care environments. Unfortunately, three of the eight regression analyses offered unclear or mixed support for one or both of the proposed models. Future analyses will help clarify whether the pattern of relations between home-based caregivers and the environments they create is best

conceptualized as covariant or independent or if, perhaps, the relation is dependent upon the behavioral processes under investigation.

Within the full model of predictors and across type of care, are there any discrete variables that are particularly important to the prediction of behavioral processes?

Although there are many significant coefficients among the 16 individual predictors examined in this study, very few are consistent in their prediction of positive or negative behavioral processes and interactions. As a group, the features of the environment are more likely to predict adults' and children's behaviors. The caregiver variables have inconsistent predictive value both individually and as a group. This is true of less commonly measured caregiver qualities, such as concerns about caregiving, and more theoretically important variables such as caregiver formal and recent training. Child traits are not particularly useful predictors of behavioral interactions (as a group they significantly predict only one of the dependant variables); however their influence will briefly be discussed in the context of the ways in which children's characteristics may influence their own behavior and their interactions with their caregivers.

Environmental variables. As would be predicted from the literature, fewer children per adult (a low ratio) is associated primarily with positive behavioral interactions among 24-month-old children and their caregivers in both child care centers and family child care homes, including: a higher frequency of positive engagement and lower levels of children's negative and aggressive behavior in child care homes. An interesting exception to this pattern is that higher ratios are *positively* associated with positive and prosocial interactions with peers in both types of settings. Depending on the

developmental goals we have for toddler age children, higher child-adult ratios could be considered problematic or beneficial. If the goal of an early childhood program is to provide children with positive social interactions with peers for a few hours each week, perhaps higher numbers of children (or larger group sizes) in the setting would be acceptable; however given the importance of child-adult verbal interaction to language and cognitive development at this age and the fact that higher levels of peer interactions are associated with lower levels of language ability (McCartney, 1984) the benefits of low ratios probably outweigh the pleasures of positive peer interactions for children who are in care many hours each day.

Health, safety, and scheduling practices and the availability of particular learning materials may also be important predictors of behavioral processes. Positive engagement between children and their caregivers is predicted by adherence to recommended scheduling practices and the health practices in the setting even in the presence of all of the other environmental and caregiver variables. Not surprisingly, health, safety and scheduling practices are strong predictors of the behavioral measure that is derived from the same global quality instrument (Assessment Profile). It seems likely that the underlying "global" quality that this and similar measures assess is adherence to professionally recommended standards. It is important to note that although these measures are associated with a few of the behavioral interactions specified in these analyses, they are by no means consistent predictors of *all* of the behavioral processes. There must be important determinants of both children's and adults' behaviors that go

unmeasured by these global instruments and that operate outside of the influence of Developmentally Appropriate Practice.

Caregiver variables. Of the seven caregiver variables included in the models, only traditional beliefs about child rearing is consistently associated with a particular pattern of behavioral interaction. Caregivers with traditional beliefs about childrearing are *more* likely to allow higher rates of television viewing (in child care homes) and *less* likely to be positively engaged with the 24-month-old children in their care (in child care centers). This interesting finding highlights the importance of caregivers attitudes toward children and the fact that there are certain qualities that caregivers bring to their work that would be difficult, if not impossible to regulate or change. The lack of a consistent direction of prediction among the other caregiver variables points to the fact that the most important measures of caregiver traits may not yet be included in the model or that their influence is not powerful enough to perform consistently in the presence of large numbers of predictors.

Child effects. There are very few relations between the children's sex, race, intellectual development or temperament and the behavioral interactions they experience in care. Even when there are significant relations, they are not *consistent* predictors of the behavioral processes among 24-month-old children and their adult caregivers. Overall, it appears that these child traits are less important than the characteristics of caregivers and the caregiving environment in the prediction of these processes. There is always the possibility that a relevant predictor (e.g., child behavior problems) has been excluded from the analyses, but overall there appears to be little evidence for the notion

that more competent or agreeable children are more likely to experience more positive and fewer negative behavioral interactions in their child care settings.

Conclusions and Future Directions

Although this study appears to have made a clear case for the development of a new model for examining the determinants of child care processes, there are several noteworthy limitations. First, although our behavioral processes were measured on a moment-to-moment basis, it is not possible to make any claims about absolute rates of these behaviors across center- and home-based child care. Second, it is probably the case that caregivers were on their "best behavior" in the presence of the observers. For example, it is quite likely that these process measures underestimate the frequency of television viewing, scolding and punishing by caregivers, and other undesirable behaviors. Similarly, it is likely that we have overestimated the frequency of positive child-caregiver interactions. Hopefully the overall *pattern* of behaviors across caregivers is approximately the same, even if the absolute rates are a little over- or under inflated. Finally, there may not have been enough variability in the quality of care to detect all of the meaningful effects of these predictors. Although participation rates among caregivers were high, there is some evidence that the caregivers who refused to participate in the child care observations were of lower quality than those who agreed to participate in the study.

In spite of these limitations, examining the determinants of child care quality in the context of the theoretical model outlined in Figure 1 makes several important contributions and suggests several possible avenues for further research. First, it seems

clear that current conceptualization of and methodologies used to examine child care quality are inadequate. The analyses presented in this paper offer strong support for a new theoretical model that distinguishes between the characteristics of caregivers, the caregiving environment and the behavioral processes of adults and children in the caregiving setting. This model has demonstrated predictive validity and a strong theoretical foundation; it properly considers behavioral processes not as components of quality, but as the mechanism by which development occurs. The model appears to be particularly useful for examining the independent determinants of child care quality in child care centers, but it can also be useful for enriching our understanding of behavioral processes in child care homes.

An important part of the operationalization of this model in future research will be the *development of measures* that effectively distinguish between the environmental, caregiver, and behavioral aspects of care. Thoughtfully designed measures must comprise meaningfully distinct subscales among the predictors and focus on theoretically grounded behavioral processes. It is difficult to interpret the results of analyses in which it is unclear whether the behavioral processes in question can be properly considered development-enhancing. For example, process indicators for television viewing should distinguish between general audience and educational programming. Similarly, measures of caregiver teaching techniques, guidance and discipline should clearly specify particular behaviors and interactions that are most important to children at different developmental stages.

Although we have a number of useful individual predictors at our disposal (e.g., child-adult ratio), it is clear that some of the best predictors of behavioral interactions have yet to be operationalized and included in current analyses. Future efforts to improve the prediction of these processes should begin with a consideration of the types of personal qualities that might be associated with the sensitive and responsive caregiving of toddler age children. Caregiver beliefs appear to be useful predictors, as may be measures of caregiver emotional availability. There may be many untapped paths to sensitive caregiving that go beyond the typical measures of formal and recent training that were so strikingly fruitless in these analyses. For example, caregivers' adult attachment classification could be expected to affect their ability to respond sensitively and appropriately to the children in their care. Secure adult attachment may be associated with caregiver's ability to correctly interpret children's emotional states and respond sensitively to their distress. This ability is particularly important when caring for toddler age children for whom issues of self-regulation and the exercising of autonomy are among the key developmental goals of the period.

Future efforts also should find ways to operationalize the quality and complexity of children's play with peers and with materials in the caregiving setting; these interactions are, theoretically, just important as interpersonal interactions with caregivers in promoting development and possibly more important than the "best practices" that are currently the focus of global quality measures. This perspective on the importance of play (see Howes & Stewart, 1987 for an example) has been ignored in recent years. There is a great deal to be learned from refocusing our efforts on the examination of

quality and complexity of play and children's interactions within the context of the proposed theoretical model.

The results of these analyses and the theoretical model they support are also important to parents and policymakers. These analyses clearly highlight the importance of child-caregiver ratio. It seems clear that one of the most powerful ways to ensure that children will have more positive and fewer negative experiences in child care is to limit the number of children for whom any one caregiver is responsible. The proposed model emphasizes the importance of behavioral processes. In the absence of consistent, definitive environmental and caregiver determinants of optimal caregiving processes, it is important for parents to take the time to do extensive observations of child and caregiver behavior in the caregiving setting before making any enrollment decisions on behalf of their children.

Tables

Table 1

Descriptive Statistics for Dependent Variables

Setting	Dependant Variable	N	Range	Mean	Median	Standard Deviation
Child Care Homes	Positive Engagement	184	15.5 - 275	112.00	106.25	50.40
	Directive/Negative Interactions	184	1 - 56.5	15.5	14.0	9.95
	Negative Peer Interactions	184	0 - 22.5	3.28	2.50	3.49
	Positive Peer Interactions	184	0 - 88	25.33	24.25	17.00
	Recommended Teaching Practices	184	9 - 36	18.56	17.50	7.12
	Caregiver Scolds/Punishes	182	0 - 8	1.5	1.00	1.58
	Child Watching Television	184	0 - 44	7.01	3.00	9.31
	Watching, Unoccupied, Transition	184	0 - 38.5	13.88	13.00	7.28
Child Care Center	Positive Engagement	177	25 - 182	89.64	90.50	35.16
	Directive/Negative Interactions	177	3 - 62	16.14	13.64	10.01
	Negative Peer Interactions	177	0 - 16.5	3.75	3.00	3.26
	Positive Peer Interactions	177	1 - 67.5	25.49	26.00	11.57
	Recommended Teaching Practices	177	6 - 28	14.27	15.00	5.07
	Child Watching Television	177	0 - 17.5	1.21	0.00	3.36
	Watching, Unoccupied, Transition	177	0 - 44.5	19.90	19.5	8.00

Table 2
Centers: Intercorrelations Among Independent Variables (*n =142-177*)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1 Profile: Materials	1																
2. Profile: Health	.20**	1															
3. Profile: Schedule	.29**	.25***	1														
4. Observed Group Size	-.08	.01	-.10	1													
5. Observed Ratio	.01	-.11	-.09	.36***	1												
6. Beliefs about childrearing	-.07	-.10	.04	-.13	.17*	1											
7. Formal training	.04	.09	.17*	-.02	-.26***	-.33***	1										
8. Caregiver education	.02	.07	.13	-.01	-.27***	-.37***	.54***	1									
9. Caregiving meets own needs	.01	.00	-.05	.00	.01	.07	.03	-.08	1								
10.Rewards of working with young children	.07	.02	.07	-.04	-.01	.04	.05	.00	.40***	1							
11. Concerns about work characteristics	-.23**	-.08	-.15#	-.12	.07	.24**	-.05	-.06	-.04	-.06	1						
12. Concerns about caring for young child	-.17*	.02	-.08	.06	.01	-.01	-.12	-.05	.03	.07	.44***	1					
13. Caregiver depression	.02	-.03	-.08	-.14#	-.03	.09	.05	-.09	.07	.07	-.19*	-.28***	1				
14.Professionalism	-.03	.15	.06	-.22**	-.29***	.06	.24**	.09	.03	.16*	.07	.06	-.03	1			
15. Caregiver Recent training	.03	.01	-.01	.06	.08	-.10	.04	-.06	-.03	-.01	-.13	-.12	.08	-.05	1		
16. Caregiver age	.01	-.01	.03	-.08	.05	.16#	-.14#	-.09	.03	.08	.02	.11	-.06	.07	-.07	1	
17. Caregiver years of experience	.03	.04	.13	-.08	.09	.11	.01	-.07	.01	.10	-.02	.10	.03	.18*	-.01	.46***	1

Table 3 *Homes: Intercorrelations Among Independent Variables* (*n =159 -184*)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1 CCHOME Materials	1																
2. Profile: Safety	.16*	1															
3. Profile: Schedule	.21**	.17*															
4. Observed Ratio	.27***	.09	-.12	1													
5. Traditional beliefs about childrearing	35***	-.07	-.14#	-.26***	1												
6. Caregiver Formal Training	.40***	.21**	.20*	.29***	-.41***	1											
7. Caregiver Education	.35***	.18*	.14#	.15#	-.32***	.53***	1										
8. Caregiving meets own needs	.04	.03	-.02	.12#	.03	.10	.13	1									
9. Rewards of working with young Children	-.07	-.11	.09	-.08	.24**	-.07	-.08	.22**	1								
10. Concerns about caring for young children	.02	-.03	.01	-.14#	.02	-.00	-.12	-.03	.14#	1							
11. Concerns about work characteristics	-.14#	-.08	-.09	-.21**	.19*	-.10	-.11	-.14#	-.04	.31***	1						
12. Caregiver depression	-.12	.01	.02	-.06	.02	-.15#	.00	-.04	-.10	-.33***	-.28***	1					
13. Professionalism	.14#	.13#	.06	.22**	-.05	.22**	.01	.17*	.18*	.10	-.22**	-.11	1				
14. Caregiver Recent Training	.26***	.09	.03	.30***	-.15*	.25**	.06	.05	-.01	-.04	-.34***	.08	.25**	1			
15. Caregiver age	-.18*	-.16*	.00	-.19*	.29***	-.16*	-.18*	-.17*	.22**	.15#	.01	-.14#	.05	-.01	1		
16. Caregiver years of experience	.051	-.08	-.07	.09	.12	.03	-.13#	-.14#	.17*	.05	-.02	-.09	.16*	.10	.51***	1	
17. Presence of caregivers own children	.22**	.07	-.10	.18*	-.31***	.12	.31***	.23**	-.17*	-.03	-.04	-.05	-.15#	.09	-.48***	-.37***	1

Table 4

Centers: Correlations Between the Independent and Dependent Variables

	ORCE Positive Engagement	ORCE Directive/ Negative	ORCE Negative Peer	ORCE Positive Peer	Recommended Teaching Practices	Child Watching TV	Watching, Unoccupied Transition
Child Female	.098	-.058	-.095	-.038	.051	-.124	-.012
Child White	-.071	-.144#	.019	.098	.090	-.066	.103
Bayley MDI At 15 months	.137#	-.020	.044	.041	.131#	-.145#	-.042
Temperament at 6 months	-.057	-.021	-.005	-.116	-.067	-.013	-.049
Profile: Materials	.086	-.116	-.048	-.067	.300***	.124	-.069
Profile: Health	.274***	-.031	.015	-.195**	.320***	-.179*	-.056
Profile: Schedule	.120	.086	-.079	-.238**	.394***	-.091	.038
Observed group size	-.213**	.007	-.006	.255***	-.157*	.188*	.100
Observed Ratio	-.438***	-.026	.074	.372***	-.083	.139#	.083
Traditional Beliefs about childrearing	-.277***	.012	-.064	.148#	-.089	.096	.001
Caregiver Formal Training	.279***	.081	.141#	-.179*	.040	-.044	.093
Caregiver Education	.212**	-.031	.097	-.129#	.042	-.039	.138#
Work meets caregivers own needs	.091	.079	.041	-.065	.036	.120	-.061
Reward of working with young children	.094	-.070	.021	.233**	.085	-.002	.072
Concerns about caring for young children	.130	.102	.021	.024	-.051	-.123	.161
Concerns about work characteristics	-.062	.083	-.006	.055	-.062	-.004	.159*
Caregiver Depression	-.090	-.019	.060	-.089	-.096	.078	.033
Caregiver Professionalism	.289***	.155*	.021	-.151#	.115	-.044	-.206**
Caregiver Recent Training	.080	.137#	.122	.055	-.027	-.025	-.175*
Caregiver Age	.110	-.022	-.049	.121	.069	-.072	-.135#
Caregivers years of experience	.089	-.034	.045	-.023	.129#	-.033	-.119

Table 5

Correlations Between the Independent and Dependent Variables in Child Care Homes

	ORCE Positive Engagement	ORCE Directive/ Negative	ORCE Negative Peer	ORCE Positive Peer	Recommended Teaching Practices	CCHOME Punishment/ Restrictiveness	Child Watching TV	Watching, Unoccupied Transition
Child Female	.039	-.047	-.058	.016	.020	-.042	.004	-.096
Child White	.029	-.118	-.055	-.041	-.010	-.018	.075	.054
Bayley MDI 15 mo.	.106	-.003	.106	.036	.002	-.113	.083	-.206**
Temperament at 6 months	.137#	.105	-.040	-.140#	.118	-.127#	-.094	-.114
CCHOME: Materials	.004	-.050	.045	.176*	.386***	-.173*	-.092	.024
Profile: Safety	.045	-.045	-.011	.048	.288***	-.179*	.058	-.186*
Profile: Schedule	.351***	.082	-.145*	-.197**	.584***	.584***	-.022	-.245***
Observed Ratio	-.463***	-.158*	.304***	.450***	.057	.191**	.123#	.313***
Traditional Beliefs about childrearing	-.024	.093	-.027	-.056	-.172	.057	.248***	-.156*
Caregiver Formal Training	-.056	-.181*	.085	.115	.244**	-.066	-.190*	.148#
Caregiver Education	.024	-.137#	-.066	.037	.177*	-.136	-.113	.046
Work meets caregivers own needs	-.252***	-.280***	-.094	.055	-.085	.098	.156	.095
Reward of working with young children	.090	.123	-.016	-.023	.056	-.048	-.047	-.013
Concerns about caring for young children	.102	-.005	-.112	-.138#	.017	-.120	.153*	-.147
Concerns about work characteristics	.110	-.058	-.233**	-.190*	.047	-.068	.100	-.173*
Caregiver Depression	.125#	.216**	.121	.016	-.077	.074	-.139#	-.046
Caregiver Professionalism	-.182*	.007	.077	.150#	.103	.068	.010	.141#
Caregiver Recent Training	-.181*	-.033	.159*	.268***	.035	.075	.059	.074
Caregiver Age	.041	-.010	.040	-.059	-.024	.036	.060	-.171*
Caregivers years of experience	-.071	.061	.136#	.063	-.027	.194*	-.054	.101
Presence of caregivers own children	-.071	-.187*	-.129#	.146*	.065	-.007	-.006	.067

Table 6

Summary of Hierarchical Regressions Predicting Behavioral Processes in Child Care Centers (N = 177)

		Positive Engagement			Directive Interactions		
		B	*SE*	R^2	*B*	*SE*	R^2
Controls	Child Female	5.51	5.30		-1.19	1.52	
	Child White	-13.03	7.88		-4.59 *	2.26	
	Bayley MDI	0.41 #	0.21		0.02	0.06	
	Temp at 6mo.	-5.27	6.61		-1.26	1.90	
	F (4, 172) =1.84 *ns*			0.04	*F* (4, 172) = 1.21 *ns*		0.03
Environment	Child Female	3.29	4.69		-1.22	1.53	
	Child White	-9.35	6.97		-4.95 *	2.28	
	Bayley MDI	0.36 #	0.19		0.03	0.06	
	Temp at 6mo.	-7.04	5.87		-1.12	1.92	
	Materials	1.26	2.13		-0.98	0.70	
	Health	5.69 **	1.82		0.02	0.59	
	Schedule	0.11	1.08		-0.27	0.35	
	Ratio	-7.49 ***	1.21		-0.13	0.40	
	F (8, 168) = 8.05 ***			0.28	*F* (8, 168) = 1.05 *ns*		0.05
Improvement over controls		*F* (4, 168) = 13.71 ***			*F* (4, 168) = .90 *ns*		
Caregiver	Child Female	3.75	4.87		-1.44	1.51	
	Child White	-14.23 #	7.33		-4.62 *	2.27	
	Bayley MDI	0.35 #	0.20		0.00	0.06	
	Temp at 6mo	-4.93	6.12		-1.80	1.90	
	Professionalism	4.24 **	1.32		0.84 *	0.41	
	Concerns	3.16	2.36		0.99	0.73	
	Traditional Beliefs	-0.54 **	0.17		0.02	0.05	
	Rewards	4.38	3.07		0.23	0.95	
	Years Experience	0.48	0.57		-0.16	0.18	
	Formal training	3.50 #	1.91		0.28	0.59	
	Recent training	5.25	5.49		3.37 *	1.70	
	F (11, 165) = 4.46 ***			0.23	*F* (11, 165) = 1.41 *ns*		0.09
Improvement over controls		*F* (7, 165) = 5.75 ***			*F* (7, 165) = 1.51 *ns*		
Full Model	Child Female	2.29	4.46		-1.38	1.52	
	Child White	-11.27 #	6.70		-4.92 *	2.29	
	Bayley MDI	0.32 #	0.18		0.01	0.06	
	Temp at 6mo	-6.87	5.65		-1.53	1.93	
	Materials	1.51	2.06		-0.82	0.70	
	Health	4.82 **	1.74		-0.11	0.60	
	Schedule	0.10	1.06		-0.26	0.36	
	Ratio	-6.42 ***	1.25		0.11	0.43	
	Professionalism	2.16 #	1.25		0.85 *	0.43	
	Concerns	4.10 #	2.18		0.76	0.75	
	Traditional Beliefs	-0.40 **	0.15		0.01	0.05	
	Rewards	4.58	2.80		0.26	0.96	
	Years Experience	0.74	0.53		-0.13	0.18	
	Formal training	1.97	1.79		0.41	0.61	
	Recent training	7.96	5.02		3.24 #	1.71	
	F (15, 161) = 6.48 ***			0.38	*F* (15, 161) = 1.22 *ns*		0.10
Improvement after adding Caregiver		*F* (7, 161) = 3.67 **			*F* (7, 161) = 1.39 *ns*		
Improvement after adding Environment		*F* (4, 161) = 9.51 ***			*F* (4, 161) = .72 *ns*		

Table 6 continued

Summary of Hierarchical Regressions Predicting Behavioral Processes in Child CareCenters (N = 177)

		Child Negative/Aggressive			Child Positive/Prosocial		
		B	*SE*	R^2	*B*	*SE*	R^2
Controls	Child Female	-0.67	0.50		-0.94	1.76	
	Child White	0.04	0.74		2.46	2.62	
	Bayley MDI	0.01	0.02		0.01	0.07	
	Temp at 6mo.	0.04	0.62		-2.79	2.20	
	F (4, 172) = .54 *ns*			0.01	*F* (4, 172) = .91 *ns*		0.02
Environment	Child Female	-0.62	0.51		-0.02	1.62	
	Child White	-0.06	0.75		1.22	2.41	
	Bayley MDI	0.01	0.02		0.02	0.07	
	Temp at 6mo.	0.02	0.63		-2.29	2.03	
	Materials	-0.12	0.23		0.07	0.74	
	Health	0.11	0.20		-0.91	0.63	
	Schedule	-0.10	0.12		-0.88 *	0.37	
	Ratio	0.11	0.13		2.07 ***	0.42	
	F (8, 168) = .53 *ns*			0.02	*F* (8, 168) = 5.35 ***		0.20
Improvement over controls		*F* (4, 168) = .52 *ns*			*F* (4, 168) = 9.62 ***		
Caregiver	Child Female	-0.72	0.50		-0.63	1.73	
	Child White	0.10	0.75		3.06	2.61	
	Bayley MDI	0.01	0.02		0.01	0.07	
	Temp at 6mo	0.06	0.63		-2.96	2.18	
	Professionalism	-0.03	0.14		-0.65	0.47	
	Concerns	0.14	0.24		-0.73	0.84	
	Traditional Beliefs	0.00	0.02		0.10	0.06	
	Rewards	0.15	0.32		-1.85 #	1.09	
	Years Experience	0.03	0.06		-0.06	0.20	
	Formal training	0.32	0.20		-0.93	0.68	
	Recent training	0.88	0.56		1.72	1.95	
	F (11, 165) = .82 *ns*			0.05	*F* (11, 165) = 1.67 #		0.10
Improvement over controls		*F* (7, 165) = .97 *ns*			*F* (7, 165) = 2.08 *		
Full Model	Child Female	-0.65	0.51		0.14	1.62	
	Child White	-0.01	0.76		1.99	2.43	
	Bayley MDI	0.01	0.20		0.02	0.07	
	Temp at 6mo	0.09	0.64		-2.26	2.05	
	Materials	-0.11	0.23		0.02	0.75	
	Health	0.09	0.20		-0.83	0.63	
	Schedule	-0.13	0.12		-0.90 *	0.38	
	Ratio	0.16	0.14		1.93 ***	0.45	
	Professionalism	0.00	0.14		-0.09	0.46	
	Concerns	0.09	0.25		-1.04	0.79	
	Traditional Beliefs	0.00	0.02		0.07	0.06	
	Rewards	0.14	0.32		-1.99 #	1.01	
	Years Experience	0.03	0.06		-0.09	0.19	
	Formal training	0.39 #	0.20		-0.22	0.65	
	Recent training	0.80	0.57		0.78	1.82	
	F (15, 161) = .81 *ns*			0.07	*F* (15, 161) = 3.42 ***		0.24
Improvement after adding Caregiver		*F* (7, 161) = 1.12 *ns*			*F* (7, 161) = 1.16 *ns*		
Improvement after adding Environment		*F* (4, 161) = .79 *ns*			*F* (4, 161) = 7.50 ***		

Table 6 continued

Summary of Hierarchical Regressions Predicting Behavioral Processes in Child Care Centers (N = 177)

		Recommended Teaching Practices			Watching/Unoccupied/Transition		
		B	*SE*	R^2	*B*	*SE*	R^2
Controls	Child Female	0.12	0.26		-0.04	1.22	
	Child White	0.25	0.39		2.70	1.81	
	Bayley MDI	0.01	0.01		-0.05	0.05	
	Temp at 6mo.	-0.17	0.32		-0.71	1.52	
	F (4, 172) = .95 *ns*			0.02	*F* (4, 172) = .77 *ns*		0.02
Environment	Child Female	0.05	0.23		-0.09	1.23	
	Child White	0.48	0.34		2.57	1.83	
	Bayley MDI	0.01	0.01		-0.05	0.05	
	Temp at 6mo.	-0.37	0.29		-0.74	1.54	
	Materials	0.27 *	0.10		-0.56	0.56	
	Health	0.28 **	0.09		-0.23	0.48	
	Schedule	0.22 ***	0.05		0.32	0.29	
	Ratio	-0.04	0.06		0.35	0.32	
	F (8, 168) = 7.60 ***			0.27	*F* (8, 168) = .77 *ns*		0.04
Improvement over controls		*F* (4, 168) = 13.96 ***			*F* (4, 168) = .77 *ns*		
Caregiver	Child Female	0.12	0.26		-0.07	1.17	
	Child White	0.26	0.39		1.98	1.76	
	Bayley MDI	0.01	0.01		-0.03	0.05	
	Temp at 6mo	-0.10	0.33		-0.73	1.47	
	Professionalism	0.07	0.07		-0.99 **	0.32	
	Concerns	-0.11	0.13		1.26 *	0.56	
	Traditional Beliefs	-0.01	0.01		0.03	0.04	
	Rewards	0.12	0.16		-0.06	0.74	
	Years Experience	0.04	0.03		-0.17	0.14	
	Formal training	-0.02	0.10		1.03 *	0.46	
	Recent training	-0.14	0.29		-2.77 *	1.31	
	F (11, 165) = .94 *ns*			0.06	*F* (11, 165) = 2.54 **		0.15
Improvement over controls		*F* (7, 165) = .94 *ns*			*F* (7, 165) = 3.51 **		
Full Model	Child Female	0.04	0.23		-0.13	1.18	
	Child White	0.44	0.35		1.90	1.77	
	Bayley MDI	0.01	0.01		-0.03	0.05	
	Temp at 6mo	-0.37	0.29		-0.86	1.49	
	Materials	0.26 *	0.11		-0.41	0.55	
	Health	0.26 **	0.09		-0.04	0.46	
	Schedule	0.23 ***	0.06		0.29	0.28	
	Ratio	-0.03	0.07		0.35	0.33	
	Professionalism	0.05	0.07		-0.90 **	0.33	
	Concerns	0.01	0.11		1.22 *	0.58	
	Traditional Beliefs	-0.01	0.01		0.02	0.04	
	Rewards	0.12	0.15		-0.03	0.74	
	Years Experience	0.03	0.03		-0.21	0.14	
	Formal training	-0.11	0.09		1.01 *	0.47	
	Recent training	-0.06	0.26		-2.86 *	1.33	
	F (15, 161) = 4.28 ***			0.29	*F* (15, 161) = 2.00 *		0.16
Improvement after adding Caregiver		*F* (7, 161) = .62 *ns*			*F* (7, 161) = 3.32 **		
Improvement after adding Environment		*F* (4, 161) = 12.71 ***			*F* (4, 161) = .57 *ns*		

Table 7

Summary of Hierarchical Regressions Predicting Behavioral Processes in Child Care Homes (N = 184)

		Positive Engagement			Directive Interactions		
		B	*SE*	R^2	*B*	*SE*	R^2
Controls	Child Female	1.90	7.51		-0.86	1.49	
	Child White	4.21	13.39		-3.56	2.65	
	Bayley MDI	0.30	0.28		0.01	0.06	
	Temp at 6mo.	16.61 #	9.68		2.36	1.91	
	F (4, 179) =1.29 *ns*			0.03	*F* (4, 179) = 1.10 *ns*		0.02
Environment	Child Female	1.38	6.36		-0.78	1.49	
	Child White	-2.08	11.38		-3.99	2.66	
	Bayley MDI	0.28	0.23		0.01	0.06	
	Temp at 6mo.	14.83 #	8.18		2.37	1.92	
	Materials	1.52	1.61		-0.11	0.38	
	Safety	0.19	1.14		-0.12	0.27	
	Schedule	17.01 ***	4.02		0.82	0.94	
	Ratio	-13.06 ***	1.94		-0.89 #	0.45	
	F (8, 175) = 10.76 ***			0.33	*F* (8, 176) = 1.35 *ns*		0.06
Improvement over controls		*F* (4, 175) = 19.69 ***			*F* (4, 175) = 1.58 *ns*		
Caregiver	Child Female	4.19	7.42		-0.87	1.48	
	Child White	-3.39	13.61		-2.17	2.72	
	Bayley MDI	0.23	0.27		0.01	0.06	
	Temp at 6mo	16.85 #	9.83		3.04	1.96	
	Professionalism	-2.20	1.99		0.49	0.40	
	Concerns	4.43	4.27		-0.60	0.85	
	Traditional Beliefs	-0.22	0.26		0.03	0.05	
	Rewards	-6.42	4.25		-2.19 *	0.85	
	Years Experience	0.45 #	0.26		0.02	0.05	
	Formal training	-0.51	3.16		-1.22 #	0.63	
	Recent training	-15.30 #	8.28		-0.57	1.65	
	F (11, 172) = 2.04 *			0.12	*F* (11, 164) = 1.64 #		0.10
Improvement over controls		*F* (7, 172) = 2.42 *			*F* (7, 172) = 1.93 #		
Full Model	Child Female	1.34	6.42		-0.98	1.49	
	Child White	-7.04	11.89		-2.17	2.76	
	Bayley MDI	0.25	0.23		0.01	0.05	
	Temp at 6mo	14.49 #	8.50		3.04	1.97	
	Materials	1.51	1.73		0.10	0.40	
	Safety	0.43	1.16		-0.15	0.27	
	Schedule	17.00 ***	4.10		1.11	0.95	
	Ratio	-12.12 ***	2.10		-0.75	0.49	
	Professionalism	-1.18	1.73		0.59	0.40	
	Concerns	2.72	3.70		-0.73	0.86	
	Traditional Beliefs	-0.28	0.23		0.03	0.05	
	Rewards	-6.33 #	3.66		-2.22 **	0.85	
	Years Experience	0.07	0.23		0.00	0.05	
	Formal training	-0.96	2.84		-1.20 #	0.66	
	Recent training	-7.55	7.30		-0.05	1.69	
	F (15, 168) = 6.42 ***			0.37	*F* (15, 168) = 1.55 #		0.12
Improvement after adding Caregiver		*F* (7, 168) = 1.32 *ns*			*F* (7, 168) = 1.73 *ns*		
Improvement after adding Environment		*F* (4, 168) = 16.46 ***			*F* (4, 168) = 1.25 *ns*		

Table 7 continued

Summary of Hierarchical Regressions Predicting Behavioral Processes in Child Care Homes (N = 184)

		Child Negative/Aggressive			Child Positive/Prosocial		
		B	*SE*	R^2	*B*	*SE*	R^2
Controls	Child Female	-0.37	0.52		1.10	2.53	
	Child White	-1.05	0.93		-4.75	4.52	
	Bayley MDI	0.03 #	0.02		0.09	0.09	
	Temp at 6mo.	-0.55	0.67		-6.92 *	3.26	
	F (4, 179) = 1.12 *ns*			0.03	*F* (4, 179) = 1.32 *ns*		0.03
Environment	Child Female	-0.40	0.50		0.88	2.26	
	Child White	-0.70	0.90		-2.41	4.04	
	Bayley MDI	0.04 #	0.02		0.09	0.08	
	Temp at 6mo.	-0.52	0.65		-6.78 *	2.90	
	Materials	-0.04	0.13		0.74	0.57	
	Safety	-0.01	0.09		0.23	0.41	
	Schedule	-0.38	0.32		-3.40 *	1.43	
	Ratio	0.62 ***	0.15		3.99 ***	0.69	
	F (8, 175) = 3.25 **			0.13	*F* (8, 175) = 7.67 ***		0.26
Improvement over controls		*F* (4, 175) = 5.26 ***			*F* (4, 175) = 13.64 ***		
Caregiver	Child Female	-0.67	0.52		-0.16	2.48	
	Child White	-0.47	0.95		-2.02	4.54	
	Bayley MDI	0.04 *	0.02		0.13	0.09	
	Temp at 6mo	-0.83	0.68		-8.21 *	3.28	
	Professionalism	0.09	0.14		0.44	0.67	
	Concerns	-0.87 **	0.30		-3.05 *	1.42	
	Traditional Beliefs	0.01	0.02		0.01	0.09	
	Rewards	-0.49 #	0.30		0.04	1.42	
	Years Experience	-0.01	0.02		-0.03	0.09	
	Formal training	0.18	0.22		0.67	1.05	
	Recent training	0.79	0.58		7.88 **	2.76	
	F (11, 172) = 1.98 *			0.11	*F* (11, 172) = 2.45**		0.14
Improvement over controls		*F* (7, 172) = 2.44 *			*F* (7, 172) = 3.04 **		
Full Model	Child Female	-0.58	0.50		0.71	2.27	
	Child White	-0.24	0.93		-0.26	4.21	
	Bayley MDI	0.04 *	0.02		0.11	0.08	
	Temp at 6mo	-0.74	0.67		-7.60 *	3.01	
	Materials	-0.07	0.14		0.70	0.61	
	Safety	-0.04	0.09		0.16	0.41	
	Schedule	-0.43	0.32		-3.58 *	1.45	
	Ratio	0.53 **	0.17		3.69 ***	0.74	
	Professionalism	0.04	0.14		0.04	0.61	
	Concerns	-0.78 **	0.29		-2.37 #	1.31	
	Traditional Beliefs	0.01	0.02		0.06	0.08	
	Rewards	-0.51 #	0.29		0.02	1.30	
	Years Experience	0.01	0.02		0.08	0.08	
	Formal training	0.17	0.22		0.09	1.01	
	Recent training	0.48	0.57		4.78 #	2.58	
	F (15, 168) = 2.57 **			0.19	*F* (15, 168) = 4.80 ***		0.30
Improvement after adding Caregiver		*F* (7, 168) = 1.69 *ns*			*F* (7, 168) = 1.38 *ns*		
Improvement after adding Environment		*F* (4, 168) = 3.83 **			*F* (4, 168) = 9.86 ***		

Table 7 continued

Summary of Hierarchical Regressions Predicting Behavioral Processes in Child Care Homes (N = 184)

		Recommended Teaching Practices			Caregiver Scolds/Punishes		
		B	*SE*	R^2	*B*	*SE*	R^2
Controls	Child Female	0.04	0.28		-0.08	0.24	
	Child White	0.05	0.49		-0.04	0.42	
	Bayley MDI	0.00	0.01		-0.01	0.01	
	Temp at 6mo.	0.56	0.36		-0.47	0.31	
	F (4, 179) = .64 *ns*			0.01	*F* (4, 177) = 1.20 *ns*		0.03
Environment	Child Female	-0.17	0.21		0.02	0.21	
	Child White	0.18	0.38		0.00	0.38	
	Bayley MDI	0.00	0.01		-0.01	0.01	
	Temp at 6mo.	0.34	0.27		-0.33	0.27	
	Materials	0.21 ***	0.05		-0.09 #	0.05	
	Safety	0.10 *	0.04		-0.05	0.04	
	Schedule	1.14 ***	0.13		-0.78 ***	0.13	
	Ratio	0.04	0.06		0.16 *	0.06	
	F (8, 175) = 17.66 ***			0.45	*F* (8, 173) = 8.56 ***		0.28
Improvement over controls		*F* (4, 175) = 34.20 ***			*F* (4, 173) = 15.51 ***		
Caregiver	Child Female	-0.02	0.27		-0.11	0.24	
	Child White	-0.06	0.50		0.14	0.44	
	Bayley MDI	0.00	0.01		-0.01	0.01	
	Temp at 6mo	0.60	0.36		-0.51	0.32	
	Professionalism	0.08	0.07		0.02	0.07	
	Concerns	0.07	0.16		-0.17	0.14	
	Traditional Beliefs	-0.01	0.10		0.01	0.01	
	Rewards	-0.09	0.16		0.05	0.14	
	Years Experience	0.02	0.01		-0.01	0.01	
	Formal training	0.26 *	0.12		-0.07	0.10	
	Recent training	-0.14	0.31		0.24	0.27	
	F (11, 172) = 1.61 ns			0.09	*F* (11, 170) = .95 *ns*		0.06
Improvement over controls		*F* (7, 172) = 2.14 *			*F* (7, 170) = .81 *ns*		
Full Model	Child Female	-0.13	0.21		-0.02	0.21	
	Child White	0.20	0.40		0.07	0.39	
	Bayley MDI	0.00	0.01		-0.01	0.01	
	Temp at 6mo	0.48 #	0.28		-0.40	0.28	
	Materials	0.24 ***	0.06		-0.11 #	0.06	
	Safety	0.10 *	0.04		-0.06	0.04	
	Schedule	1.14 ***	0.14		0.81 ***	0.14	
	Ratio	0.09	0.07		0.12 #	0.07	
	Professionalism	0.04	0.06		0.02	0.06	
	Concerns	0.17	0.12		-0.20	0.12	
	Traditional Beliefs	0.00	0.01		0.00	0.01	
	Rewards	-0.12	0.12		0.06	0.12	
	Years Experience	0.01	0.01		0.00	0.01	
	Formal training	0.00	0.10		0.05	0.09	
	Recent training	-0.29	0.24		0.18	0.24	
	F (15, 168) = 9.95 ***			0.47	*F* (15, 166) = 4.82 ***		0.30
Improvement after adding Caregiver		*F* (7, 168) = 1.08 *ns*			*F* (7, 166) = .69 *ns*		
Improvement after adding Environment		*F* (4, 168) = 29.93 ***			*F* (4, 166) = 14.63 ***		

Table 7 continued

Summary of Hierarchical Regressions Predicting Behavioral Processes in Child Care Homes (N = 184)

		Child Watching Television			Watching/Unoccupied/Transition		
		B	*SE*	R^2	*B*	*SE*	R^2
Controls	Child Female	0.00	1.39		-1.25	1.06	
	Child White	1.39	2.49		2.61	1.90	
	Bayley MDI	0.06	0.05		-0.11 **	0.04	
	Temp at 6mo.	-2.29	1.80		-1.28	1.37	
	F (4, 179) = .87 *ns*			0.02	*F* (4, 179) = 3.13 *		0.07
Environment	Child Female	-0.05	1.40		-0.97	0.98	
	Child White	0.64	2.51		3.70 *	1.76	
	Bayley MDI	0.05	0.05		-0.11 **	0.04	
	Temp at 6mo.	-2.45	1.81		-0.81	1.26	
	Materials	-0.32	0.36		0.06	0.25	
	Safety	0.29	0.25		-0.45 *	0.18	
	Schedule	-0.25	0.89		-1.58 *	0.62	
	Ratio	-0.56	0.43		1.30 ***	0.30	
	F (8, 175) = .97 *ns*			0.04	*F* (8, 175) = 6.74 ***		0.24
Improvement over controls		*F* (4, 175) = 1.07 *ns*			*F* (4, 175) = 9.73 ***		
Caregiver	Child Female	0.73	1.35		-1.95 #	1.04	
	Child White	2.82	2.48		2.86	1.90	
	Bayley MDI	0.05	0.05		-0.10 **	0.04	
	Temp at 6mo	-1.40	1.79		-1.61	1.37	
	Professionalism	0.01	0.36		0.35	0.28	
	Concerns	1.42 #	0.78		-1.19 *	0.60	
	Traditional Beliefs	0.11 *	0.05		-0.03	0.04	
	Rewards	1.09	0.78		0.09	0.59	
	Years Experience	0.03	0.05		-0.10 **	0.04	
	Formal training	-1.10 #	0.58		0.48	0.44	
	Recent training	3.38 *	1.51		-0.21	1.16	
	F (11, 172) = 2.51 **			0.14	*F* (11, 172) = 3.23 ***		0.17
Improvement over controls		*F* (7, 172) = 3.41 **			*F* (7, 172) = 3.13 **		
Full Model	Child Female	0.57	1.37		-1.52	0.97	
	Child White	2.35	2.54		3.57 *	1.80	
	Bayley MDI	0.05	0.05		-0.10 **	0.04	
	Temp at 6mo	-1.69	1.82		-1.02	1.28	
	Materials	-0.01	0.37		-0.18	0.26	
	Safety	0.30	0.25		-0.51 **	0.17	
	Schedule	0.22	0.88		-1.76 **	0.62	
	Ratio	-0.24	0.45		0.87 **	0.32	
	Professionalism	-0.03	0.37		0.38	0.26	
	Concerns	1.42 #	0.79		-1.17 *	0.56	
	Traditional Beliefs	0.10 *	0.05		-0.02	0.03	
	Rewards	1.16	0.78		0.00	0.55	
	Years Experience	0.02	0.05		-0.07 #	0.03	
	Formal training	-1.19 #	0.61		0.75 #	0.43	
	Recent training	3.49 *	1.56		-0.66	1.10	
	F (15, 168) = 1.96 *			0.15	*F* (15, 168) = 4.92 ***		0.31
Improvement after adding Caregiver		*F* (7, 168) = 3.00 **			*F* (7, 168) = 2.41 *		
Improvement after adding Environment		*F* (4, 168) = .51 *ns*			*F* (4, 168) = 8.11 ***		

Table 8

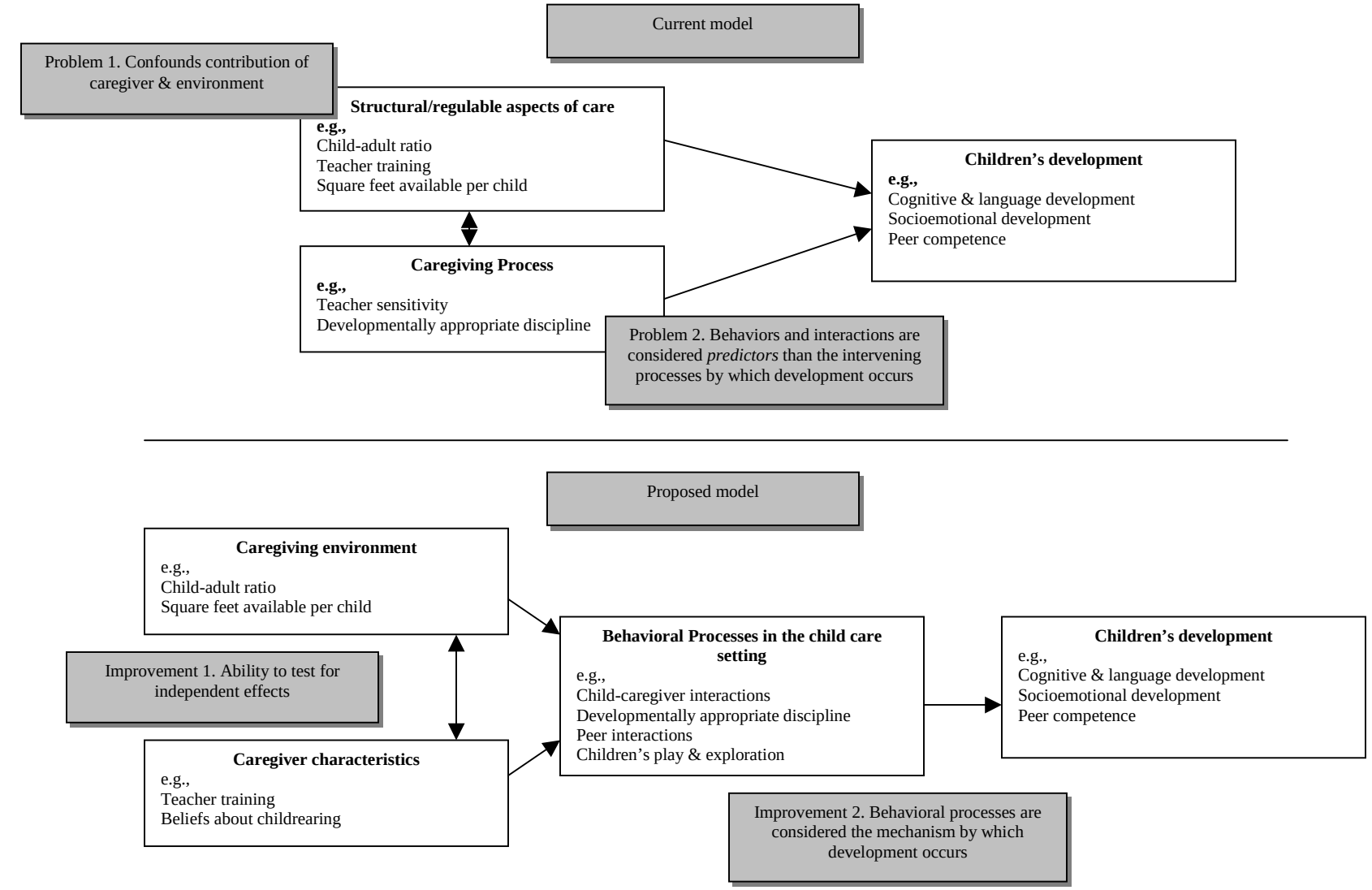
Pattern of Results from the Hierarchical Regressions Comparing the Additive and Covariance Models in Child Care Centers and Child Care Homes.

Dependent Variable	Child Care Centers	Child Care Homes
Positive Engagement	Independent	Covariance
Directive Interactions	Unclear (Independent)	Unclear (Independent)
Child Negative/Aggressive	Unclear	Unclear (Mixed)
Child Positive/Prosocial	Independent	Covariance
Recommended Teaching Practices	Independent	Covariance
Caregiver Scold/Punishes	N/A	Unclear (Mixed)
Child Watching Television	N/A	Independent
Child Watching/ Unoccupied/Transition	Independent	Independent

Note. Parentheses are used to denote the relation suggested by the results from this study, and to note that the evidence is not strong enough to make a definitive statement about the pattern of relations.

Figures

Figure 1. A comparison current and proposed conceptualizations of the way child care quality effects children's development.



Appendices

Appendix A

Descriptive statistics comparing the families of children whose primary child care arrangement is non-relative family based child care to those in center based care.

Family Characteristic	Family Child Care (N= 259)	Center (N = 226)
Child gender		
Male	133 (51%)	113 (50%)
Female	126 (49%)	113 (50%)
Child Ethnicity		
White	230 (89%)	186 (82%)
Black	18 (7%)	23 (10.2%)
Other	11 (4%)	17 (7.5%)
Child birth order		
1st	140 (54%)	111 (49%)
2nd	82 (32%)	82 (36%)
3rd or later	37 (14%)	33 (15%)
Mother's mean age	29	29
Median maternal education	14 years (mean 14.8)	14 years (mean 14.9)
Median income-to-needs ratio	3.65 (mean- 4.03)	3.44 (mean 4.47)
Median weekly costs for care	$60.00 (mean $71.33)	$67.50 (mean $74.53)
Median hours in this arrangement	40 (mean-33 hours)	40 (mean- 34 hours)
Median hourly wage (mother)	$10.82	$10.82
Median annual wage (mother)	$20,000	$22,500
Time of day mother works		
Day	183 (84%)	157 (87%)
Varies	20 (9%)	18 (10%)
Not-day	15 (7%)	5 (3%)

Appendix B

Descriptive Statistics for Controls and Independent Variables Before Imputation: Child Care Centers

Independent Variable	N	Range	Mean	Median	Standard Deviation
Child Sex	177	0 - 1	.48	.00	.50
Child White	177	0 - 1	.85	1.00	.36
Bayley MDI	170	76 - 142	109.74	109.00	13.35
Temperament	175	2.04-4.02	3.12	3.09	.41
Profile: Schedule *	177	2 - 48	19.52	18.00	7.47
Profile: Materials *	177	3 - 14	7.40	6.00	3.44
Profile: Health *	177	4 - 28	14.80	15	4.77
Observed Group Size	177	3.38 - 37.75	10.49	9.88	4.73
Observed Ratio	177	1.64 - 12.44	5.42	5.06	1.92
Traditional Beliefs about Childrearing	156	33 - 111	71.42	71.50	16.63
Caregiver Formal Training	166	0 - 4	1.72	2.00	1.42
Caregiver Education	166	1 - 5	3.02	3.00	.89
Work Meets Own Needs	154	1.2 - 4.0	2.72	2.80	.63
Working with Children Rewarding	155	2.5 - 4.0	3.68	3.83	.36
Concerns About Caring for Young Children	150	1.13 - 4.0	2.99	3.00	.52
Concerns about Working in Child Care	156	1 - 3.56	2.24	2.22	.57
Caregiver Depression	153	0 - 26	7.25	6.00	5.37
Caregiver Professionalism	165	2 - 12	9.15	9.00	2.01
Caregiver Recent Training	173	0 - 1	.72	1.00	.45
Caregiver Age	165	18 - 68	29.96	26.00	10.58
Caregiver Years of Experience	166	0 - 35	5.17	4.00	4.48

Note. * It was necessary to impute the means on several of the items and *then* create the summary variables.

Appendix C

Descriptive Statistics for Controls and Independent Variables Before Imputation: Child Care Homes

Independent Variable	N	Range	Mean	Median	Standard Deviation
Child Sex	184	0 - 1	.48	0.00	.50
Child White	184	0 - 1	.91	1.0	.29
Bayley MDI at 15 months	179	63 - 150	109.78	109.00	14.14
Temperament at 6 months	183	2 - 4.12	3.12	3.13	.39
CC HOME Materials	184	0 - 10	8.14	9.00	2.09
Safety *	184	5 - 20	7.80	8.00	3.66
Formal Schedule *	184	3 - 14	6.19	6.00	2.73
Observed Group Size	184	1 - 11.63	4.38	4.44	2.17
Observed Ratio	184	.52 -8.75	3.48	3.31	1.73
Traditional Beliefs about Childrearing	177	30 - 116	74.38	74.0	16.49
Caregiver Formal Training	164	0 - 4	1.22	0.00	1.22
Caregiver Education	165	1 - 5	2.65	3.00	.94
Work Meets Own Needs	177	1 - 4	3.15	3.40	.75
Working with Children Rewarding	177	2.5 - 4	3.63	3.67	.38
Concerns About Caring for Young Children	176	1.88 - 4.0	3.14	3.13	.51
Concerns about Working in Child Care	178	1.56 - 4.0	3.26	3.33	.56
Caregiver Depression	177	0 - 39	5.20	4.0	5.49
Caregiver Professionalism	159	2.6 - 12	8.07	8.06	2.16
Caregiver Recent Training	183	0 - 1	.34	0.00	.48
Caregiver Age	163	13 - 75.57	38.81	37	11.44
Caregiver Years of Experience	164	0 - 44	7.23	4.0	8.31

Note. * It was necessary to impute the means on several of the items and *then* create the summary variables.

Appendix D
Correlations of Independent Variables with Child (Control) Variables: Child Care Centers

	Child Female	Child White	15 Month Bayley MDI	Temperament at 6 months
1. Child Female	1			
2. Child White	.016	1		
3. 15 Month Bayley MDI	.145#	.300***	1	
4. Temperament at 6 months	.001	-.220**	-.159*	1
5. Profile: Materials	-.035	-.076	.000	.027
6. Profile: Health	.026	-.041	.069	.128#
7. Profile: Schedule	.082	-.074	.038	.073
8. Observed Ratio	-.071	.058	.019	.008
9. Observed Group Size	-.073	-.005	-.032	-.003
10. Traditional Beliefs about Childrearing	-.043	-.021	-.010	.033
11. Caregiver Formal Training	.022	-.032	-.030	-.050
12. Caregiver Education	.110	.069	.068	-.114
13. Caregiving Meets Own Needs	.004	.087	.017	-.002
14. Rewards of working with young Children	-.032	-.129	-.102	.034
15. Concerns about caring for young children	.022	.103	.055	-.029
16. Concerns about work characteristics	.042	.147#	.127	.027
17. Caregiver depression	.034	.020	-.057	-.018
18. Professionalism	.046	.030	.102	-.001
19. CG Recent Training	.020	-.085	.027	.054
20. Caregiver Age	-.036	-.055	-.054	-.095
21. Caregiver years of experience	-.003	.046	.045	-.088

Appendix E
Correlations of Independent Variables with Child (Control) variables: Child Care Homes

	Child Female	Child White	15 Month Bayley MDI	Temperament At 6 months
1. Child Female	1			
2. Child White	.121	1		
3. 15 Month Bayley MDI	.079	.226**	1	
4 Temperament at 6 months	.078	-.128#	.110	1
5. CCHOME Learning materials	-.011	-.051	.019	.004
6. Profile: Safety	.117	.089	.053	.097
7. Profile: Schedule	.080	-.040	-.050	.067
8. Observed Ratio	.026	-.112	-.065	.022
9. Traditional Beliefs about Childrearing	-.088	-.159*	.025	-.053
10. Caregiver Formal Training	.112	.053	.023	.056
11. Caregiver Education	.126	-.013	.063	.053
12. Caregiving Meets Own Needs	.011	.084	-.015	-.033
13. Rewards of working with young Children	-.178*	-.136#	-.065	.077
14. Concerns about caring for young children *	.006	.104	.038	-.128#
15. Concerns about work characteristics	-.071	.144#	.139#	-.153*
16. Caregiver depression	.013	-.129#	.084	-.194*
17. Professionalism	.025	-.150#	-.110	-.192*
18. CG Recent Training	.043	-.129#	-.086	.054
19. Caregiver Age	-.124	.007	-.125	-.039
20. Caregiver years of experience	-.008	-.043	-.065	-.010
21 Presence of caregivers own children	.121	.145*	.075	-.144#

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VITA

Catherine Abbamonte Malerba was born in Fort Worth, Texas on April 27, 1967, the daughter of Patricia Cassidy Abbamonte and Michael Abbamonte. After attending Trinity Valley School for many years, she spent her senior year at and graduated from Nolan High School in 1985. She attended both the University of Texas at Austin and Quinnipiac College in Hamden, Connecticut between 1985 and 1991. Ms. Malerba returned to the University of Texas in 1992 and graduated with a Bachelor of Arts in psychology in 1996. After several years of work in early education settings, Ms. Malerba entered the graduate school at the University of Texas at Austin and was awarded a Master of Arts in Human Development and Family Sciences in 2002. During her tenure as a graduate student, Ms. Malerba taught several courses in child development and family interaction at the University of Texas at Austin and Texas State University.

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